DOCUMENT RESUME

ED 171 880 CE 017 395

TITLE User's Manual. Educational Progress in Careers.
INSTITUTION EPIC, Inc., Tallahassee, Fla.
SPONS AGENCY Florida State Dept. of Education, Tallahassee. Div. of Vocational Education.
PUB DATE Jan 77
NOTE 90p.; For related documents see CE 017 393-400 and CE 017 406 ; Best copy available

EDRS PRICE MF01 Plus Postage. PC Not Available from EDRS.
DESCRIPTORS *Career Education; *Community Education; *Community Involvement; Data Analysis; Data Collection; *Economic Education; *Educational Assessment; Elementary Secondary Education; *Evaluation Methods; Guidelines; Program Planning; Surveys; Test Interpretation
IDENTIFIERS Educational Progress in Careers; Florida

ABSTRACT

Divided into six chapters, this user's manual accompanies a battery of tests developed by the Educational Progress in Careers (EPIC) project which was organized to develop and validate a system for evaluating career, economic, and community education projects in Florida schools. Chapter 1 presents an action checklist of steps to be followed by local personnel in planning and implementing the EPIC evaluation system. Chapter 2 describes the project organization, purposes of EPIC, the ten components of career/economic/ and community education, the instrument battery, instrument reliability and validation procedures, and other related topics. Chapter 3 provides guidelines for selecting the evaluation coordinator and the evaluation committee. Finally, chapters 4 through 6 provide guidelines for planning the evaluation, conducting the data collections, and using the results. Additional information concerning interpretation of results and uses of the instruments is appended. (See CE 017 406 for a full description of EPIC project activities and instrument validation.) (BM)

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EDUCATIONAL PROGRESS IN CAREERS

USER'S MANUAL

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STATE OF FLORIDA DEPARTMENT OF EDUCATION
TALLAHASSEE, FLORIDA 32304

JANUARY 1977

CE 017 395

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FOREWORD

The emerging challenge to educators in Florida is performance. During the 1950's and 60's Florida, more than other states, was faced with growth in student populations. Providing teachers and classrooms for these students was a desperate task. Today that challenge has been successfully met. But the basic task of equipping students with the skills and attitudes necessary for a happy and productive life remains.

Current research suggests that many students leave the schools unequipped to be successful in their lives. Florida educators have responded to this challenge with a variety of programs. But programs are not enough. The success of those programs must be measured so that they can be extended and improved. The EPIC system helps fill a gap in our existing evaluation tools. It covers the areas of career, economic and community education. It also serves as a vehicle for involving members of the local community.

I recommend that you use the EPIC system to help you assess your programs and build community participation and support for your efforts.

Ralph D. Turlington

Ralph D. Turlington
Commissioner of Education

ACKNOWLEDGMENTS

This manual was originally prepared by the staff of EPIC, Inc., a subsidiary of the Florida Council of 100, pursuant to a contract with the Division of Vocational Education.

EPIC, Inc. was organized by the Florida Council of 100 to help Florida's public education system better prepare children for life in the real economic world.

Council members believe that realistic education prepares students to be happy and productive adults. Students must understand the economic system in order to succeed within it.

Educators have developed programs of career-economic-community education which they believe will achieve these important requirements of realistic education. EPIC, Inc. is a developmental project that is helping to bring the resources of the community to these three movements in education.

The EPIC project was based upon the recommendations of a large number of Florida business, labor and professional executives who worked with educators and parents in the refinement of the EPIC system. Many of these people served on the Statewide Evaluation Committee, listed in Appendix I. The development of the EPIC system would have been impossible without them. Grateful acknowledgment is made of their participation and of the continuing support of the Florida Council of 100.

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Background

The major challenge facing American schools has shifted from meeting the demands of growth to meeting public demands for higher levels of student performance. A number of traditional indicators of student performance have shown sustained declines over the past decade. Some newly developed measures show that American adults do not leave school equipped with the skills necessary to survive in everyday life.

At the same time, there is little hope that schools will receive additional resources to meet this new challenge. In recent years, public education has been the beneficiary of a rapid increase of available resources. But, there seems to be little public support for a continuation of this trend. Various controversial issues such as busing, school prayer, and discipline, have plagued schools and eroded public support. The policies implemented as a result of these issues often complicate the basic educational task. In short, public educational systems have serious problems which must be resolved within current resources.

One possible solution is career education, which attempts to link school work more closely with the major activities of adult life. Career education was originally proposed in 1969. Since then, it has received support from the U. S. Office of Education and several State Legislatures. The State of Florida was one of the first to develop and implement career education programs on a state-wide basis. The Florida Legislature and the Vocational Division of the Florida Department of Education also supported several major projects to develop career education materials. Hundreds of thousands of students have been exposed to these programs in Florida schools. However, there has not been a large number of student performance evaluations of career education in Florida or elsewhere.

EPIC, Inc. has developed a battery of instruments which may be used to evaluate student performance, as well as program process, in the areas of career and economic education. There are also instruments for teachers, administrators, parents and the general public which encompass career, economic and community education. The system was designed to incorporate the ideas and concerns of people from the local community.

The process used in the development of this instrument battery was unique in that it incorporated the ideas and suggestions of people from business, industry, labor, education, and the professions, as well as the general public. These people were involved in the initial design of the components of the system, as well as in the reviewing and modifying of specific instruments as they were constructed.

The system was developed around ten components, as follows:

1. Knowledge of the Economic System
2. Knowledge of Occupations

3. Guidance for Realistic Career Decisions

4. Employment-Entry Skills

5. Alternatives for Potential Early School Leavers

6. Student-Worker Contacts

7. Placement and Follow-Up

8. Staff Development

9. Community Involvement

10. Community-School Facility Utilization

The system can produce benefits for students and parents, teachers and administrators, as well as the business community. A number of benefits have been documented during the development process. Among the benefits that have been documented are: the capability of the instruments to identify successful program components, a minimal negative reaction from students to testing, and the exposure of students to occupations and career planning activities that they were unaware of previously.

See Appendix II, "The Challenge to Public Education," for an expansion of some of the concepts presented above.

CHAPTER 1

ACTION CHECKLIST

Coincident with the growth of career education has been the growth of educational evaluation. There are a large number of evaluation models available for a variety of purposes. The evaluation model suggested here is based on three assumptions, as follows:

1. Schools should serve their community.

2. Students should leave senior high school with some preparation for becoming productive members of society.

3. People from all areas of society should be involved with educational programs, from development through evaluations.

The first step in an evaluation, based on these assumptions, is to assess the community's needs and resources. Once these needs are established, the existing school programs can be evaluated in terms of those needs. This process can provide an assessment of the effectiveness of the school's current efforts. However, to find out <u>why</u> things are happening, is a much more complex process. The knowledge, skill, and activities of the people in the schools, as well as the school's organization, need to be examined in relation to measured performances. This kind of information can provide a basis for planning future actions.

Evaluation is an action-oriented process. The purpose of an evaluation is to produce information useful to decision-makers. Decisions should be followed up by evaluations of their effectiveness. Ideally, the evaluation committee should not go out of business; it should plan to follow-up the results of its evaluation with further evaluations. In this way, a continuous action-feedback loop is maintained.

The following steps are provided to assist local personnel in the successful planning and implementation of the EPIC evaluation system.

<u>Step One: Decide to conduct an evaluation.</u>

1a. <u>Consider the situation</u>! Evaluations are not free - they consume resources like any other action. Thus, a decision must be made that an evaluation would be helpful. As is pointed out in the introduction, schools face serious problems with limited resources. It is critical, therefore, that successful programs be identified and supported and unsuccessful programs be modified or terminated.

1b. <u>Consider the EPIC system</u>. The EPIC system contains instruments appropriate for evaluating career, economic and community education programs. <u>Chapter Two</u> describes the EPIC system and its development. Due to the broad coverage of the instrument battery, the system can be used to look for side effects produced by the program, as well as to measure the accomplishments of specific program objectives.

Step Two: Select the evaluation coordinator and the evaluation committee.

2a. Select the evaluation coordinator. Chapter Three describes the work of the evaluation coordinator and the evaluation committee. It is important to involve concerned individuals, especially when their approval must be sought before the evaluation can be conducted. The process of deciding to conduct an EPIC evaluation will usually result in an obvious candidate for the job of evaluation coordinator. The most important qualifications for the evaluation coordinator are the interest in collecting the data and the ability to collect and disseminate the data with the cooperation of contributors and users. (The evaluation coordinator need not be a statistician or a specialist in evaluation procedures.)

2b. Select the evaluation committee. An evaluation produces data. But the data can only be made meaningful by interpreting it in light of the goals and priorities of the school district and the local community. The role of the evaluation committee is to make certain that the goals of the district and the community are emphasized. The committee should be composed of people from business, labor, and the professions, as well as parents and students with appropriate school district personnel. The committee is a working group, so it should not exceed eight to ten members. The exact composition can be varied to meet local situations. It should always include a regional consultant from the Department of Vocational Education, who supplies the test materials, as well as valuable information from serving on other district evaluation committees.

Step Three: Select evaluation questions, instruments, test samples, and arrange for the data collections.

3a. Select evaluation alternatives. The evaluation coordinator should review Chapter Four to identify some alternate ways of conducting the evaluation. Generally it is desirable to select one plan and one alternative for recommendation to the evaluation committee. The alternatives presented in Chapter Four are intended for use by people with little or no background in evaluation design. More knowledgeable coordinators can develop plans which go beyond these suggestions, based on their own skills and experience.

3b. Elicit evaluation committee opinions. The evaluation committee should meet to consider the evaluation coordinator's recommendations. The important objective of this meeting is to elicit the opinions of the committee members. An evaluation cannot produce meaningful answers if the wrong questions are asked, or if the wrong instruments are used to determine performance against stated goals. Since the evaluation committee represents the schools, as well as the community, it must consider carefully how the evaluation questions and instruments relate to the key concerns of the schools and the community.

3c. Determine test samples. Test samples and sample sizes may be determined by the evaluation coordinator after reviewing Chapter Four. Members of the Vocational Division staff are also available for consultation on this requirement.

Step Three: (Continued)

3d. Arrange for the data collection. The evaluation coordinator should review Chapter Four before coordinating with personnel from the specific schools which have students who will be tested. This should include arranging for the date, starting times, test monitors, meeting places, instrument clearance, and any other support items required for the testing.

Step Four: Conduct the data collection

Test booklets and answer sheets will be provided by regional consultants of the Vocational Division. Chapter Five contains detailed instructions on how each instrument in each booklet should be administered.

Step Five: Data reduction and analysis.

5a. Coordinate the test booklets and answer sheets. After the test booklets are collected, the evaluation coordinator should contact the Dissemination and Diffusion Section of the Vocational Division to discuss the methods most advantageous to the individual school district by which the data reduction and analysis may be performed, and a preliminary report of the evaluation written.

5b. Scoring keys and data reduction procedures. In the event a school district wishes to perform their own data scoring and reduction, the scoring keys and procedures may be found in Appendix V.

Step Six: Interpreting the results and making recommendations.

6a. Distribute the evaluation report to committee members. Reports should contain descriptions which do not require statistical training to understand. The detailed findings should be available for reference. Chapter Six contains information that should be helpful in understanding and using the results of the evaluation.

6b. Review of findings and recommendations. Arrange for one or more meetings of the evaluation committee to discuss the results and consider what actions should be recommended. During this period, other potential users may be invited to attend and discuss specific areas in which they have special knowledge or concern. The product of this meeting or meetings should be a final list of findings with appropriate recommendations. Committee members and other potential users should be furnished a copy of these findings and recommendations for review and comment. The committee should consider the comments and ideas that other potential users have submitted, as well as any additional ideas that they may have. These should be incorporated into a final report of the evaluation.

Step Seven: Take action on the resolutions of the committee.

The purpose of evaluation is to provide information to guide program modifications and related activities. The specific process by which the evaluation committee's report is utilized will vary from community to community. But the evaluation process should mobilize both school district personnel and community members. It is an opportunity that should not be thrown away.

CHAPTER TWO

THE EPIC SYSTEM

Project Organization

EPIC, Inc. was organized in July, 1974 as an affiliate of the Florida Council of 100, to develop and validate a system for evaluating career, economic, and community education projects in Florida schools.

The Chairman of the Florida Council of 100 Education Committee, Bill Dover, who was a member of the Governor's Committee on Education from 1971-73, was the founder of EPIC, Inc. Mr. Dover organized EPIC, Inc. in order that "outsiders" could participate with educators at all levels of career, economic and community education, from planning and implementation through evaluation.

The Education Committee of the Florida Council of 100 selected career-economic-community education as areas in which members were especially interested. This committee believed that broad cross-sections of people in Florida school districts must jointly plan to improve the education offered in their districts and, therefore, better equip children and adults for the world in which they live.

Based on that belief, the committee organized EPIC, Inc. as a non-profit educational corporation (directed by members of the Florida Council of 100 Education Committee), to request and receive funds to conduct research and evaluation studies in all phases of career-economic-community education.

The committee recognized, as did Florida educators, the sparsity of instruments, and procedures necessary to assess career, economic and community education in the State. Therefore, in July, 1974, EPIC, Inc. contracted with the Vocational Division of the Florida Department of Education to develop and validate an evaluation system for collecting data on career-economic-community education from students, staff, administrators and parents, which educators and lay-community members could use to determine the effectiveness of local programs.

The Statewide Evaluation Committee was organized by the EPIC Board of Directors in August, 1974 as a "sounding board" in the development and validation of the EPIC evaluation system.

Purposes of Project EPIC

1) To develop and validate an evaluation system from the employers' point of view, to assist educators and school district administrators in assessing the status of career, economic and community education programs.

2) To develop valid data collection procedures at each educational level (elementary, middle/junior high and senior high), within specified time limits, which students will find comfortable while proceeding to work through the EPIC instrument battery.

3) To develop a method for continually involving business representatives, parents and educators in evaluating career, economic and community education, as members of a local evaluation committee in each Florida school district.

The Ten Components of Career-Economic-Community Education

The EPIC Board of Directors, in coordination with the Statewide Evaluation Committee and the Broward-Orange-Pinellas school district coordinators, developed ten components of career, economic, and community education, as follows:

#1 - KNOWLEDGE OF THE ECONOMIC SYSTEM: Students and teachers should understand the development and workings of our free enterprise system . . so that students may become aware that society is offering them an opportunity to prepare for a career and to provide for themselves in an economic world.

#2 - KNOWLEDGE OF OCCUPATIONS; Students should be encouraged to review labor-market information on available careers and to explore a variety of different work situations.

#3 - GUIDANCE FOR REALISTIC CAREER DECISIONS: Students should be encouraged to plan systematically for a career and become better prepared to make realistic career choices, in terms of their own interests, abilities, achievements and limitations, even as they anticipate changes in careers.

#4 - EMPLOYMENT-ENTRY SKILLS: Students should be provided with "hands-on" experiences which emphasize how academic and vocational skills are used in the working world. These experiences should lead to certificates of skill mastery to encourage students to believe that because of their education, they will not only "fit in," but will eminently succeed in our economic world.

#5 - ALTERNATIVES FOR POTENTIAL EARLY SCHOOL LEAVERS: Potential early school leavers should be encouraged to enter programs which develop skills in basic reading, communications and computation, career exploration, and skills for acquiring and working on a job.

#6 - STUDENT-WORKER CONTACTS: Students should be provided opportunities to make contact with all levels of working adults throughout the community to qualify their interests before choosing specific careers and related life styles.

#7 - PLACEMENT AND FOLLOW-UP: Students should be given the opportunity of employment or some other appropriate placement, such as higher education, before leaving school, through operational placement/follow-up systems staffed with qualified persons.

#8 - STAFF DEVELOPMENT: All administrators and staff should be provided in-service training using career and economic education strategies. Teachers should issue grades based on the completion of assigned tasks to develop students' self-confidence through trial and error performances, so that they may gain greater motivation to try and complete other tasks with less supervision.

#9 - COMMUNITY INVOLVEMENT: Community members should be involved in the planning, implementation and evaluation of educational programs.

#10 - COMMUNITY-SCHOOL FACILITY UTILIZATION: School-community agencies should cooperate for more efficient and flexible (year-round/round-the-clock) use of community facilities, resources and programs to provide educational, recreational and cultural services for every interested member of the community.

The EPIC Instrument Battery

There are currently twenty-one different instruments available to measure the performance of elementary, middle and/or junior high, and senior high students on dimensions of career and economic activity. There are also four instruments which are used only for diagnostic purposes rather than for testing. These instruments were developed in accordance with the first five components, as follows:

Instrument #	Instruments for Elementary Students
E-1	Attitudes Toward School
E-2	Worker Titles
E-3	Workers in Different Industries
E-4	Knowledge of the Economic System
	Instruments for Middle and/or Junior High Students
M-1	Attitudes Toward School
M-2	Worker Titles
M-3a/b	Education and Training Preparation
M-4	Knowledge of the Economic System
M-5	Career Planning Activities Checklist
M-6	Communications About Careers
M-7	Knowledge About a Career
M-8	Knowledge of General Career Information
M-9	Considering Careers
M-10	Considering Courses for Careers
M-11	Student Critique
M-12	Career Decision-Making (Diagnostic Only)

Instrument #	Instruments for Senior High Students
S-1	Attitudes Toward School
S-2	Worker Titles
S-3a/b	Education and Training Preparation
S-4a/b	Knowledge of the Economic System
S-5	Education/Training/Licensing and Union Requirements of Jobs
S-6	What Workers Do on the Job
S-7	Career Planning Activities Checklist
S-8	Communications About Careers
S-9	Knowledge About a Career
S-10	Knowledge of General Career Information
S-11	Considering Careers
S-12	Knowledge About Career Planning
S-13	Considering Courses for Careers
S-14	Inventory of Work Skills
S-15	Student Critique
S-16	Career Decision-Making (Diagnostic Only)
S-17	Acquiring and Maintaining a Job (Diagnostic Only)

The foregoing instruments are published in the following EPIC manuals:

Instruments for Elementary Students, Grades Two through Four

Instruments for Middle and/or Junior High Students, Grades Seven and Eight

Instruments for Senior High Students, Grades Ten and Eleven

Instruments for Teachers, Administrators and Parents

Six related instruments were developed to obtain information from school teachers, administrators, and community members, in accordance with the ten components, as follows:

Components

#1 - Knowledge of the Economic System
#2 - Knowledge of Occupations
#3 - Guidance for Realistic Career Decisions
#4 - Employment-Entry Skills
#5 - Alternatives for Potential Early School Leavers
#6 - Student-Worker Contacts
#7 - Placement and Follow-Up
#8 - Staff Development
#9 - Community Involvement
#10 - Community-School Facility Utilization

	Overview of Ten Components									
	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
Teacher's Questionnaire	x	x		x						
School Coordinator's Questionnaire			x		x	x				
Placement/Follow-Up Director's Questionnaire							x			
Career Education Director's Questionnaire								x		
Community Education Director's Questionnaire										x
Parent Questionnaire									x	x

The foregoing instruments are published in the following EPIC manuals:

Teacher's Questionnaire

Instruments for Administrators

Parent Questionnaire

What the Instrument Battery Attempts to Measure

The twenty-one different student performance instruments contain twenty-four dimensions of student behavior, which are reflected in Florida career-economic education programs, as follows:

1. Profit
2. Productivity and the Market
3. Labor Market Demand
4. Consumer Economics
5. Business Cycles and Monetary Policy
6. The Roles of Government
7. International Trade and Monetary Policy
8. Comparative Economics
9. Worker Titles (Recall)
10. Workers in Different Industries
11. Education/Training/Licensing/Union Requirments of Jobs
12. What Workers Do on the Job
13. Knowledge About Career Planning
14. Career Planning Activities
15. Career Communications
16. Career Decisions
17. Worker Titles (Identification)
18. Career Interests
19. Job Expectations
20. Employee Work Habits
21. Employee Traits and Mannerisms
22. Job Interview Activities
23. Work Skills Inventory
24. Attitudes Toward School

The six related instruments for collecting information from school teachers, administrators and community members, contain sixteen kinds of career, economic and community education activities, as follows:

1. Identification and Referral of Potential Early School Leavers
2. Field Trips
3. Workers Visiting Students
4. Career Days/Career Fairs
5. Shadowing Experiences
6. Employer-Based Cooperative Programs
7. Available Jobs
8. Student Placement
9. Student Follow-Up
10. Economics in Related Disciplines
11. Worker Titles
12. Work Skills
13. Staff and Administrative Workshop Participation
14. Parent Attitudes
15. Program, Service, Facility, Organization Demand
16. Course Demand

Involving the Business Community

The Statewide Evaluation Committee was assembled from business, industry, labor and statewide professional groups in order to assist the EPIC staff in the development of the components and instruments. The committee formed specialized task forces which provided a continual exchange of information with the EPIC staff in the development of the instruments. This was done via mailouts, telephone conversations, and live interchanges at EPIC board meetings, workshops and conferences over a two-year period. (This may be the first time in American education that the vehicle of "instrument design" has been used to effectively involve the business-labor-professional communities in a sustained working relationship with educators and the general public.)

After the committee developed and refined the ten components, a number of criteria (or evaluation questions) were reviewed. These criteria were used to sort and categorize items from over 200 instruments which were collected during a national search of career, economic and community education instruments, giving Florida a more realistic perspective of the state-of-the-art of instruments available. Twenty-four new EPIC instruments were developed from the criteria. These EPIC instruments contained dimensions of student performance which were not distinctly available in the national search instruments (now twenty-one instruments).

A number of workshops and pilot data collections were held to verify the adequacy of the new instruments. Members of the committee reviewed the results of the data collections and made recommendations at each session.

An instrument training and final validation session for members of the Statewide Evaluation Committee and lay-community members was held at the January, 1976 Conference. At this time, committee members and lay-community members signed-up to assist the EPIC staff with the March, 1976 post-test data collection sessions.

During the post-test data collections, local community members reviewed and analyzed data as it was collected and suggested appropriate refinements of the instruments and data collection procedures.

Future roles of the committee include (but are not limited to) the following:

1. "Local community" conferences with school board members and district administrators for the purpose of establishing priorities for implementing the EPIC evaluation system.

2. Assisting Department of Education regional consultants with the implementation of the EPIC evaluation system.

3. Coordination with the Florida Council on Economic Education Advisory Committee in the development of stronger economic education components.

Instrument Reliability Procedures

Reliability testing has been a continuous part of the EPIC instrument development process. This has been accomplished through the use of item analysis procedures. The statistical technique used was Kuder-Richardson formula - 20(KR-20). This procedure determines the level of internal consistency of the test (an index of the degree to which items measure the same body of content). This procedure was appropriate for instruments designed to test a single body of content, and which were scored right or wrong. This procedure was not used for the survey instruments or instruments which ask for student opinions.

The instruments were subjected to item analysis procedures at each stage of instrument development. New items were constructed based on these results.

The post-test knowledge instruments all possess adequate reliability for research and evaluation purposes. Several instruments were re-tested with new samples which indicated that the item selection procedures resulted in reliabilities in excess of 0.8 with the new sample. (The reliabilities of most standardized tests fall in the range between 0.8 and 0.9.)

Instrument Validation Procedures

The twenty-one student performance instruments have undergone the following validations:

1. The instrument items and scoring keys were developed and approved by members of the Statewide Evaluation Committee. As employers and representatives of business, labor and professional groups, this committee was organized into teams which represented thirteen different Florida industrial categories (similar to the fifteen U.S.O.E. clusters). These teams organized the student performance instruments so that students would be exposed to the world of industries in Florida, the various areas of economics, and other dimensions which employers consider critical when evaluating employees. One product of this effort was the identification of 130 occupations representative of Florida's labor market.

2. Each of the twenty-four dimensions of student behavior was compared against the original language of the Eight Elements of Career Education from the U.S.O.E.-Ohio State Comprehensive Career Education Model (CCEM). (It was presumed that most career educators in Florida would be familiar with the eight elements.) The twenty-four dimensions represent an attempt to further define the "eight elements" (a "curriculum language") into a more operational "evaluation language." Each dimension was developed by sorting (sometimes thousands) of test items, so that it would represent a "singular" dimension of student behavior.

3. The items in each instrument were examined for their ability to discriminate between experimental and control groups of career education students. Many items which could not discriminate have been eliminated from the battery.

4. Each item was examined for "floor and ceiling" effect. When almost all students in a particular grade level could perform on an item successfully, it was elminated, or moved to a lower grade level. When almost none of the students in a particular grade level could perform an item successfully, it was eliminated, or moved to a higher grade level.

5. The items were examined for reading level, using teachers as validators and by using a readability formula. This information was used when packaging the items per grade level range.

6. A number of instruments were selected for each educational level (elementary, middle/junior high, and senior high). A maximum time for administering each instrument was established. When all students (in different schools) in a particular grade level range (such as 2, 3, 4, or 7, 8, or 10, 11), completed the instruments comfortably in a similar time period (such as 50 minutes for elementary, 90 minutes for middle or junior high, and 120 minutes for senior high), the data collection procedures was considered acceptable.

7. Sub-sets of items within some instruments were examined to determine the extent of correlation of higher scores with higher grade levels. A high positive or negative correlation of scores with grade levels indicated the strong potential of each instrument in establishing norms, and the corresponding wider generalizability of data. One strength of the EPIC system is its ability to evluate career-ecnomic education performances in grades two through twelve, across school districts, regardless of individual programs or treatments of students.

All instruments, including the six additional instruments for collecting process data from teachers, administrators and parents were developed in coordination with the career education project coordinators of the Orange, Broward and Pinellas career education projects. These coordinators arranged workshops where career-economic specialists and parents modified the content and grade-level range of many items, so that by March, 1976, there was "arrangements" between the business-education-parent communities in the three districts. (Development procedures for each instrument are contained in Appendix VII).

EPIC worked with the chairman of the State Advisory Council for Community Education in the development of the instrument for community education directors.

A total of over 2,800 students, 600 staff members, 25 administrators, and 350 community members from the Orange, Broward and Pinellas school districts submitted data which was used to validate the EPIC instrument battery at several intervals of the project as follows: April-May, 1974 (pilot tests); September-October, 1975 (field-tests); March, 1976 (post-tests).

Summary of Anticipated Results

Users of the EPIC evaluation system may expect the data collected to emphasize many of the following school district career-economic-community education components:

1) Enroute to making realistic career decisions, the student begins to appreciate the workings of the economic system and the fundamentals of a work-oriented life style.

2) After exploring a number of occupations based on personal interests and labor-market information, the student investigates the education, training, licensing, and union requirements of a potential career area.

3) The student becomes familiar with working conditions, language used on the job, salary ranges and fringe benefits, and begins to form some personal job expectations.

4) Through continual contacts with community workers, and hands-on work experiences, the student begins to prefer certain jobs over other jobs.

5) The student is exposed to a checklist of career planning activities, may be identified as a "potential early school leaver," and is guided toward realistic career decisions.

6) The student is encouraged to develop skills in reading, writing, computation and communications, as well as more specialized skills for employment-entry in a particular career area, and in anticipation of changing careers.

7) The student is encouraged to practice for the job interview, to develop productive work habits, personal traits and mannerisms which will accommodate the work-team.

8) The student is encouraged to make contact with the school placement advisor, and to benefit from at least one paying job before leaving high school.

9) The staff is encouraged to bring all students to local places of work; to invite workers to visit students and discuss their careers; set up career days and career centers, and to involve students in work programs and other situations where students may watch the performance of community workers.

10) The staff is encouraged to merge career and economic activities into their ongoing academic course structures.

11) The staff is encouraged to issue student grades based on the completion of assigned tasks with a minimum of supervision, and to issue certificates to students who master specified employment-entry skills.

12) The staff is encouraged to involve parents in counseling sessions with students; to share the accountability for student performance with counselors and occupational specialists; and to work in industry one month of each year.

13) Staff members are encouraged to develop a better knowledge of our economic system in the areas of:

Profit
Productivity and the Market
Labor Market Demand
Consumer Economics
Business Cycles and Monetary Policy
The Roles of Government
International Trade and Monetary Policy
Comparative Economics

14) Community members are encouraged to coordinate local facility utilization with contact personnel and to provide educational, recreational, and cultural services on a year-round, extended-hours basis for every member of the community.

15) Community members are encouraged to participate in the development and implementation of educational policies and in the evaluation of resulting programs.

Student Benefits of the Evaluation System

1) Career Planning Information - The system provides the current status of the student's career planning activities and decisions.

2) Knowledge Required - The system provides specific knowledge of the labor market and data on skills for acquiring a job.

3) Motivation - This information can motivate students to begin additional efforts in career-related school activities.

4) Exposure to Occupations - The data suggests that many students learn about new occupations by participating in the EPIC testing.

5) Improvement in School Effectiveness - The student benefits when teachers, counselors and administrators make use of the data provided by this system to improve their own effectiveness.

NOTE: These benefits accrue to college-bound as well as non-college-bound students.

Staff Benefits of the Evaluation System

1) Individual Student Data - The system provides twenty-five dimensions of student career and economic performance.

2) Motivation - This information can be used to help teachers motivate students toward their school-related career relevant tasks.

3) Ideas - Exposure to the broad spectra of occupation and work skills in thirteen occupational fields can provide teachers with new ideas.

4) Curriculum Planning - The data can be used to revise subject matter areas that are relevant to career education.

5) School Career Planning Status - The data provides a basis for the recommendation of changes that would aid the counseling staff.

6) Individual Student Data - The system provides information on the individual students' career planning process and knowledge.

7) Student Motivation - This data can be useful in motivating students.

8) Supplements to Existing Data - This data can be usefully combined with existing ability, achievement, vocational aptitude and vocational interest tests to provide a complete profile of the student.

Administrative Benefits of the Evaluation System

1) Assessment - The system provides data on the status of the career education program.

2) Evaluation - The data can be used as the basis for an evaluation of the career-economic education programs.

3) Curriculum Planning - The information can be used to revise areas within the school curriculum to enhance its ability to respond to changes in labor-market conditions.

4) Cost-Effectiveness - This data can be combined with school budgetary information to produce cost-effectiveness information.

The foregoing benefits of the evaluation system will take on greater meaning as the system in implemented by each user group.

Purposes and Objectives Attained

Objective 1: To give many Florida students their first broad exposure to what they will need to succeed in the world of business.

Results

Approximately two-thirds of the students tested reported no previous exposure to the types of items in the test battery. Over 50% of all students indicated some kind of gain in occupational knowledge and/or career planning as a result of the exposure to the instruments.

Objective 2: To expose students to the world of Florida occupations, and the various dimensions of the field of economics.

Results

Approximately two-thirds of the students reported no previous exposure to the world of Florida occupations as contained in the test battery. Approximately 74% of the students tested reported no previous exposure to the various fields of economics tested by the EPIC instruments.

Objective 3: To expose educators and school administrators to career and economic elements.

Results

Teacher responses indicate that some students are being exposed to approximately 50% of the possible areas of economics, two-thirds of an industrial cross-section sample of occupations, and 50% of an industrial cross-section of work skills.

Objective 4: To give Florida school district personnel some valid and reliable methods for demonstrating the progress of their career, economic and community education programs.

Results

The instruments which measured the knowledge components were able to discriminate between treatment, county and/or grade groups in twenty-two out of thirty-one comparisons. All instruments had reliabilities in excess of the level desired for research and evaluation purposes except for one instrument for elementary students. The instruments for measuring career awareness and skills inventory discriminated between career education and control students consistently. Only instruments attempting to measure attitude have not been able to make discriminations between career education and control groups.

Objective 5: To develop valid data collection procedures at the elementary, middle/junior high, and senior high levels, within specified time limits, which students will find comfortable while proceeding to work through the instrument battery.

Results

Only 6% of the middle/junior high and senior high students tested reported that the test was a negative experience within the time limits which were established.

Objective 6: To develop a method for continually involving business representatives, parents and educators in evaluating career, economic and community education.

Results

A Statewide Evaluation Committee has been established with fifty members (and alternates). Local business people and parents have been continually involved during all phases of goal setting, instrument design, data collection and data review.

Comments of School District Staff

1. "The EPIC evaluation battery contains some valuable tools for the overall evaluation of the progress of career and economic programs in the schools. As pre-tests and post-tests, they will provide the classroom teacher with the necessary information on what has been accomplished and what needs to be stressed."

2. "A great deal of comprehensive thinking has gone into these instruments. For the most part they are worded well. I believe they should bring forth some valuable commentary and provide a method of making our learning more practically oriented for the big world outside. More and more, we are seeing the need for involving business people and the community in planning a realistic curriculum. Too many hours in school could be better spent in helping students cope with life and the business world; instilling the need to update skills continously after leaving school; keeping informed for survival economically."

3. "EPIC evaluation should be expanded to involve all teachers."

4. "I would like someone to categorize occupations that pertain to school subjects. Students can be exposed to jobs available in areas such as history, art, and math."

5. "Ideas for improvement and revision should be followed up by action and results that employers are seeking."

6. "Bringing different subject areas together promotes understandings of each department. School administrators should be included in every evaluation."

7. "There is a terrific potential to get everyone to work together and to integrate career information into all academic disiciplines."

8. "We should begin to involve teachers in the full program of careers and be made aware of ways to use this information."

9. "Students don't understand that a lot of the skills learned in school are used on jobs. These skills would qualify students for employment, but they don't know that they have the skills. The instruments are especially good to show eleventh and twelth graders who have been through a few years of skill development."

CHAPTER THREE

SELECTING THE EVALUATION COORDINATOR AND THE EVALUATION COMMITTEE

Selecting the Evaluation Coordinator

Frequently, the process of deciding to conduct the evaluation will have made it obvious who the coordinator should be. This will be because that person has demonstrated an interest in getting the information that the evaluation process can produce.

One of the most frequent problems with evaluations occurs when they are not responsive to the needs of the people in the system; i.e., when they are done as a matter of form and are never used in the decision-making process.

A person who needs and can use the information produced by an evaluation can usually learn the skills necessary to conduct it. This kind of person should also be considered when selecting the evaluation coordinator.

Beyond interest, the next most important qualification to look for in the coordinator is the ability to work with school and community people effectively. The coordinator will be responsible for establishing and working with the evaluation committee. The ability of the coordinator to facilitate the work of the evaluation committee will have an important impact on the ultimate success of the evaluation effort. Also, the evaluation coordinator must work with the schools whose students will be tested. Good relationships with the practitioners and administrators in these schools cannot be overemphasized when it comes to the delicate task of collecting data.

Knowledge of the existing programs in the school district is another useful qualification. Evaluations are geared to helping improve school effectiveness. It is difficult to ask important evaluation questions without a knowledge of current program objectives and methods.

A knowledge of evaluation methodology is also useful but is not required. If the coordinator is relatively sophisticated in this area, the requirement for data reduction, analysis, and report writing may be greatly simplified.

The Evaluation Committee

The evaluation committee's main task is to insure that the data collected will be meaningful and useful. To do this, the committee needs to be involved in the process of planning the evaluation. Specifically, the committee needs to review the major evaluation questions, as well as the instruments which provide data toward answering these questions. Once the data has been collected and processed, the committee relates the results to the local situation. This includes separating important results from that which is peripheral to community goals and needs. This step requires a knowledge of the existing programs and practices of the schools in the districts. The final step is to make recommendations for action based upon the findings.

The evaluation committee needs people from the community and the schools. However, it should not be so large as to be unwieldy. People from the school can provide knowledge of the current programs and practices. Representatives from the world of work (business people, labor leaders, parents and professionals) suggest the needs of the community, available resources, and changes that are likely to occur in the future.

A representative from the regional staff of the Division of Vocational Education should also be included. This person can provide information on the resources that the Division supplies, as well as information on what other districts have done. This will enable the committee to build on the successes and failures of other districts which have used the system.

CHAPTER FOUR

PLANNING THE EVALUATION

The actual planning of the evaluation consists of the following steps:

1. Select evaluation types.
2. Select evaluation questions
3. Consider the design limitations.
4. Select the instruments.
5. Estimate student sample sizes.
6. Schedule the data collections.
   a. Instrument clearance.
   b. Schools to be tested.
   c. Starting times and maximum times.
   d. "Matching" student samples.
   e. Testing rooms.
   f. Random student groups.
   g. Test monitors.
   h. Community observers
   i. Instructions to students.

Types of Evaluations- In planning an evaluation, the first thing that needs to be considered is the relation between the aims of the evaluation and the goals of the program being evaluated. An obvious choice is to evluate a program based on the goals that it is trying to achieve. This is called goal-based evaluation. An example of it would be evaluating a career awareness program based on the number of occupations that students knew. If the students had increased the number of occupations that they knew and knew many more occupations than comparable groups of students, the program could be said to be successful.

An alternative to goal-based evaluation is called goal-free evaluation. Goal-free evaluation looks not only at program goals but at possible side-effects as well. For example, the career awareness program judged successful above might be so structured that it turned kids off to the whole process of career planning. This would be a negative side-effect. Just as important are undetected positive side-effects. For instance, kids may be interested and read more. In both cases a goal-based evaluation would have missed these important results.

The instruments in this battery can be useful in both goal-based and goal-free evaluations. Because the battery encompasses a wide range of instruments, there is a good possibility that whatever the program's goals, there will be an instrument that can help assess its effectiveness. Also the battery can be used to conduct goal-free evluations within the area of career and economic education. Using other available instruments, such as standardized achievement tests, can broaden the coverage even further.

Evaluation Questions

Depending upon the knowledge of the user, there are a wide variety of ways in which this battery can be used to aid in decision-making. Three of the more common include:

1. Determining the current state of student knowledge.
2. Before and after comparisons of the above.
3. Comparisons of two or more educational methods.

The simplest test is to determine the current state of the student's knowledge or attitudes in the area(s) of interest. If the decision-maker has a pre-chosen standard to compare with the actual results, it can be determined if the current methods are resulting in satisfactory results or not. The difficult aspect of this method is determining in advance what should be adequate performance. While some arbitrary standard may be used, the whole procedure serves no useful purpose unless the standard is accurate and related to important student outcomes. This procedure may also be useful to establish baseline performance, as well as establishing which areas may require attention first.

Before and after comparisons are useful in establishing the utility of a particular method in changing the knowledge level or attitudes of students. This is most useful in the initial stages of the development or implementation of a new educational method. If no change occurs, then the method may not be working. However, if a significant change does occur, it is important to remember that another method could have produced the same or greater changes. In other words, before and after comparisons can indicate whether or not a particular method is effective, but it cannot by itself establish that the method is the best one available.

Comparisions of two methods can establish which of the methods is most effective. This type of comparison makes the most sense at a point where the methods that are being compared are fully developed and implemented. This means that the comparison is likely to reveal the differences in effectiveness that will occur if both methods were implemented across the entire school or district. By itself this comparison does not prove that the better method is also better than other methods that were not tested. It may also be the case that the better method still produces student outcomes that are less than satisfactory in an absolute sense.

Naturally any of these uses of this battery can produce misleading and useless information if the procedures are misused.

The main purpose of this battery is to produce information of value to decision-makers. But this implies that the decision-makers know what kind of decisions they will want to make and how the information will be used in making the decision. These two steps must be performed correctly if any information produced by this battery is to be of use.

Design Limitations

In any evaluation design using experiment/control groups, the validity of the comparisons depends on a number of factors.

If it is assumed that valid and reliable instruments are being used to collect data from students, it is also desirable to control for the following variables:

1. "Matching" experimental and control student populations.
2. Timing of the data collections.
3. Environmental factors such as heat, noise, light, availability of pencils, availability of responses to questions, contamination of results, etc.

The use of random selection of student samples acts as a control for other variables, such as the intent of students to do their best on written tests.

Even when all of the above factors are controlled or are constant, differences in class mean averages of student groups or the averages of teacher groups can be attributed to career education programs. More rigorous studies can isolate specific factors within the career education program which may be contributing to high student scores.

Selecting the Instruments

The actual selection of the instruments to be used is dependent upon two criteria.

1. The grade level of students to be tested.
2. The type of student begavior or knowledge to be tested.

Instruments available for each grade level range are briefly described as follows:

EPIC Student Performance Instruments

	Elementary	M/JH	Senior
Attitudes Toward School	E-1	M-1	S-1
Worker Titles	E-2	M-2	S-2
Workers in Different Industries	E-3		
Education and Training Preparation		M-3a/b	S-3a/b
Knowledge of the Economic System	E-4	M-4	S-4a/b
Education/Training/Licensing and Union Requirements of Jobs			S-5

	Elementary	M/JH	Senior
What Workers Do on the Job			S-6
Career Planning Activities Checklist		M-5	S-7
Communications About Careers		M-6	S-8
Knowledge About a Career		M-7	S-9
Knowledge of General Career Information		M-8	S-10
Considering Careers		M-9	S-11
Considering Courses for Careers		M-10	S-12
Knowledge About Career Planning			S-13
Inventory of Work Skills			S-14
Student Critique		M-11	S-15
Career Decision-Making (Diagnostic Only)		M-12	S-16
Acquiring and Maintaining A Job (Diagnostic Only)			S-17

Instruments for Elementary Students

The elementary school battery consists of four instruments for measuring student attitudes and knowledge. (Please see these instruments in the test booklet for Elementary Students, Grades Two through Four.)

E-1 - Attitudes Toward School

This instrument consists of twenty items which measure the student's attitude toward school. Scores can range from 0 to 20.

E-2 - Worker Titles

This instrument measures the student's awareness of various occupations by asking the student to write as many worker titles as possible within a ten minute period. The student can score from 0 to an unlimited number.

E-3 - Workers in Different Industries

Students are asked to identify workers that are in different industrial categories. The questions are true/false type. Student scores can range from 0 to 20.

E-4 - Knowledge of the Economic System

This instrument contains ten true/false items which test the student's knowledge of basic economics. Student scores can range from 0 to 10. This instrument has an internal consistency reliability of 0.50.

Instruments for Middle and/or Junior High Students

The middle and/or junior high school battery consists of twelve instruments for measuring student knowledge and attitudes. (Please see these instruments in the test booklet for Middle and/or Junior High Students, Grades Seven and Eight.)

M-1 - Attitudes Toward School

This instrument consists of fifteen items which ask the student to rate various aspects of school experience. The instrument provides one overall score ranging from a low of 15 to a high of 75.

M-2 - Worker Titles

This instrument asks the student to write as many worker titles as possible within a ten minute period. The student can score from 0 to an unlimited number.

M-3 - Education and Training Preparation

This instrument consists of thirty-six occupational titles. The student is asked to identify the ten titles requiring the most training and the ten titles requiring the least training. Student scores can range from 0 to 20.

M-4 - Knowledge of the Economic System

This instrument consists of twenty true/false items designed to test the student's knowledge of basic economics. Student scores can range from 0 to 20. This instrument has produced an internal consistency reliability of 0.66 with past samples.

M-5 - Career Planning Activities Checklist

This checklist asks the student to indicate how frequently he or she engages in seventeen career-related activities. The student can receive a score ranging from 17 to 85, depending on the frequency of his/her career planning activities.

M-6 - Communications About Careers

This checklist asks the student to indicate the frequency with which he or she communicates with other people about careers. There are fourteen possible modes of communication listed. The student can obtain scores ranging from 14 (if he or she never talks to anyone about careers) to 70 (if the student talks with all listed persons almost daily).

M-7 - Knowledge About a Career

This instrument consists of twenty-four areas of knowledge concerning a career. Students are asked to rate their knowledge about their own career choice in terms of each of the areas. The student scores can range from 24 (representing no knowledge about the career) to 120 (representing just about all there is to know.)

M-8 - Knowledge of General Career Information

This instrument consists of thirteen items which ask the students to rate their knowledge about a variety of activities related to general career choice. Scores can range from 13-65.

M-9 - Considering Careers

The instrument consists of 130 worker titles. The student is asked to record whether he or she has any interest in that career. The student has the option of indicating interest, possible interest, or no interest. The instrument provides an "interest" score and a "not interested" score; each can range from 0 to 130.

M-10 - Considering Courses for Careers

This instrument consists of the 26 worker titles. Students are asked to indentify the school courses that they would need "most" to enter each of the careers. The scores range from 0-26.

M-11 - Student Critique

The student is asked to indicate if he or she has worked with teachers, counselors and/or occupational specialists on questions similar to those covered by the instruments in the battery. Scores can range from 0 to 30.

M-12 - Career Decision-Making

This instrument consists of thirty-eight items which cover a variety of career plans. It is not scored, and is intended for use by counselors or occupational specialists in career counseling.

Instruments for Senior High Students

The senior high school battery consists of seventeen instruments for measuring student knowledge, attitudes and skills. (Please see these instruments in the test booklet for Senior High Students, Grades Ten and Eleven.)

S-1 - Attitudes Toward School

This instrument consists of fifteen items which ask the student to rate various aspects of school experience. The instrument provides one overall score ranging from a low of 15 to a high of 75.

S-2 - Worker Titles

This instrument asks the student to write as many worker titles as possible within a ten minute period. The student can score from 0 to an unlimited number.

S-3 - Education and Training Preparation

This instrument consists of thirty-six occupational titles. The student is asked to identify the ten titles requiring the most training and the ten titles requiring the least training. Student scores can range from 0 to 20.

S-4a/b - Knowledge of the Economic System

These instruments are two parallel forms designed to measure the student's knowledge of basic economics. Each instrument consists of twenty-five items. Scores can range from 0 to 25. These instruments have obtained internal consistency reliabilities of 0.70.

S-5 - Education/Training/Licensing and Union Requirements of Jobs

This instrument consists of fifty true/false items measuring the student's knowledge of the prerequisites for obtaining a variety of jobs. Scores can range from 0 to 50. This instrument has obtained an internal consistency reliability of 0.84 with previous samples.

S-6 - What Workers Do on the Job

This instrument consists of fifty true/false items measuring the student's knowledge of what various workers do on their jobs. Scores can range from 0 to 50. This instrument has obtained an internal consistency reliability of 0.83 with previous samples.

S-7 - Career Planning Activities Checklist

This checklist asks the student to indicate how frequently he or she engages in seventeen career-related activities. The student can receive a score ranging from 17 to 85, depending on the frequency of his or her career planning activities.

S-8 - Communications About Careers

This checklist asks the student to indicate the frequency with which he or she communicates with other people about careers. There are fourteen possible modes of communication listed. The student can obtain scores ranging from 14 (if he or she never talks to anyone about careers) to 70 (if the student talks with all listed persons almost daily).

S-9 - Knowledge About a Career

This instrument consists of twenty-four areas of knowledge concerning a career. Students are asked to rate their knowledge about their own career choice in terms of each of the areas. The student scores can range from 24 (representing no knowledge about the career) to 120 (representing just about all there is to know).

S-10 - Knowledge of General Career Information

This instrument consists of thirteen items which ask the student to rate their knowledge about a variety of activities related to general career choice. The scores can range from 13 to 65.

S-11 - Considering Careers

This instrument consists of 130 worker titles. The student is asked to record whether he or she has any interest in that career. The student had the option of indicating interest, possible interest, or no interest. The instrument provides an "interested" score and a "not interested" score; each can range from 0 to 130.

S-12 - Considering Courses for Careers

This instrument consists of 26 worker titles. Student are asked to identify the school courses that they would need "most" to enter each of the careers selected. Scores can range from 0-26.

S-13 - Knowledge About Career Planning

This instrument consists of fifteen true/false items testing student opinions about various aspects of career planning. Students can obtain a score from 0 to 15.

S-14 - Inventory of Work Skills

This instrument consists of 195 work skills in thirteen occupational categories representing the world of work. Students are asked to indicate which of the skills they possess, as well as the source of each skill. Scores range from 0 to 195. This instrument can also be scored to indicate which sources of skill development generate a greater number of work skills.

S-15 - Student Critique

The student is asked to indicate if he or she has worked with a teacher, occupational specialist and/or counselor on questions similar to those covered by each of the instruments in this battery. Scores can range from 0 to 84.

S-16 - Career Decision-Making

This instrument consists of thirty-eight items which cover a variety of career plans. It is not scored, and is intended for use by counselors or occupational specialists in career counseling.

S-17 - Acquiring and Maintaining a Job

This instrument consists of four parts, as follows:

Part a) Job Expectations
Part b) Employee Work Habits
Part c) Employee Traits and Mannerisms
Part d) Interviewing for a Job

Each part consists of twenty items. The student is instructed to select ten of the twenty items with which the student can identify best. The instrument is not scored and is intedded for use by counselors or occupational specialists in career counseling.

Estimating Student Sample Sizes

In making decisions about a school or a school district, it is much easier to collect data from a representative group of students than from the total student population. The whole science of inferential statistics exists to aid in generalizing from the sample to the whole group of students. However, virtually all of inferential statistics is based on the assumption that the sample chosen was randomly drawn from the whole population which it is supposed to represent. If this assumption is not met, the results can be wrong and badly misleading. Statistics lie more frequently through misuse than through conscious abuse.

The first concern in sampling must be the determination of, "What is the overall population of students about which decisions are going to be made?" Is it one classroom, one school or an entire school district? Once that decision has been made, a method for selecting a sample must be used that gives every student in the overall population the same chance of being selected as part of the sample. If two experimental classrooms are being compared, then it makes sense to select students only from those two classrooms. But if two schools are being compared, then selecting the sample only from two classrooms will be likely to produce results that are not representative of the performance of the two schools overall.

The best method is to take the rolls from the entire student population to be represented and then use a table of random numbers to select the students who will actually be tested. Doing this may add some time, expense and inconvenience to the process, but it is the only way of insuring that the data collected will be of value. More convenient ways generally limit the value of the information obtained. For instance, if one classroom is used instead of a random sample of the whole school, what is learned is the performance of one teacher, not the performance of the school. Another method is to avoid random selection by asking teachers or others to select a representative sample from their class or school. This method has a tendency to produce information about the better students and not about the student population as a whole.

The question that must be answered in choosing a sample size is, "How big a difference is important?" In general, the smaller the difference that is important, the larger the sample must be to detect it. Figure 1 illustrates this concept. If a difference as small as that illustrated in the top diagram is important, the total sample would have to have at least 200 people in it. On the other hand, if only differences the size of those illustrated in the bottom figure are important, only ten people would have to be in the sample.

Another consideration is the amount of variation that is expected in the groups of students to be tested. Figure 2 illustrates this concept. Far fewer students are required in the samples if there is little variation. The amount of variation among individuals can be determined empirically by testing a group. This involves extra effort but can save effort in the long run by making it easier to determine the correct sample size in advance. A second way is to estimate the variation based on a knowledge of the sample. In general, the more varied the sample, the more variation in the scores. Thus a larger sample will be required if the group being tested includes students of different ages, ethnic backgrounds, ability levels, and instructional methods. The less variation there is, the smaller the sample needs to be.

Figures 3 and 4 may help in choosing the sample size that is appropriate. Figure 3 contains the size of the sample that would have been necessary to detect statistically significant differences between samples used in past studies. The table gives some guidance as to what might be expected.

Figure 4 turns the question around. It asks, "What difference is important?" The decision-maker can choose the size of the difference that is worth trying to detect while realizing that the smaller differences will not likely be detected even if they are quite real.

Since both tables are easy to use, the best policy would be to look at both and determine a sample size based on both the likely amount required to get significance and the importance of the difference.

Figure 1 - "How Important is a Small Difference?"

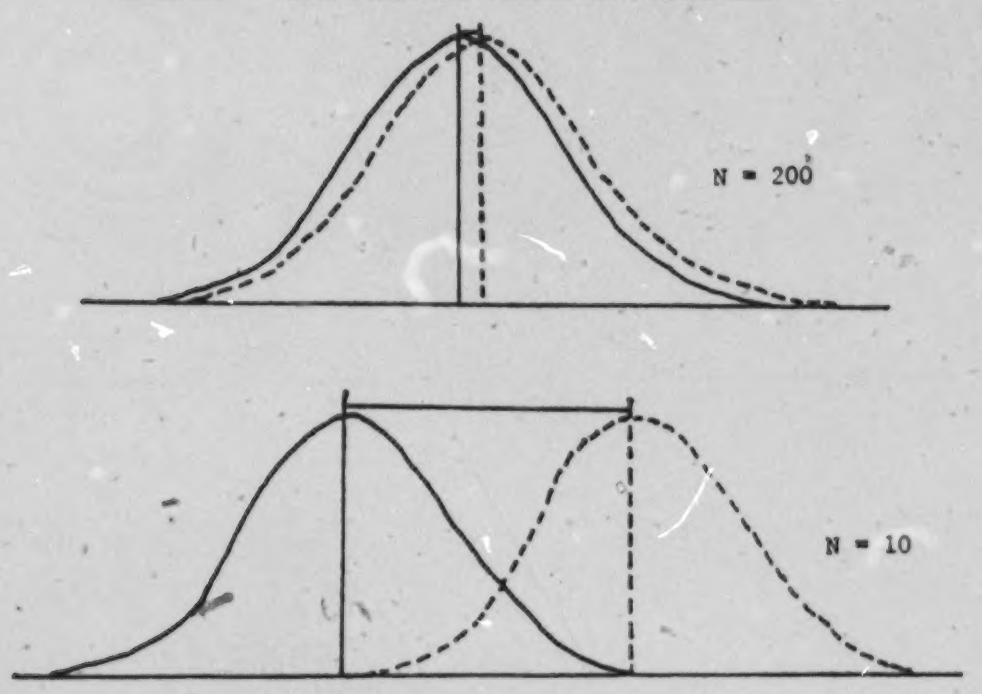
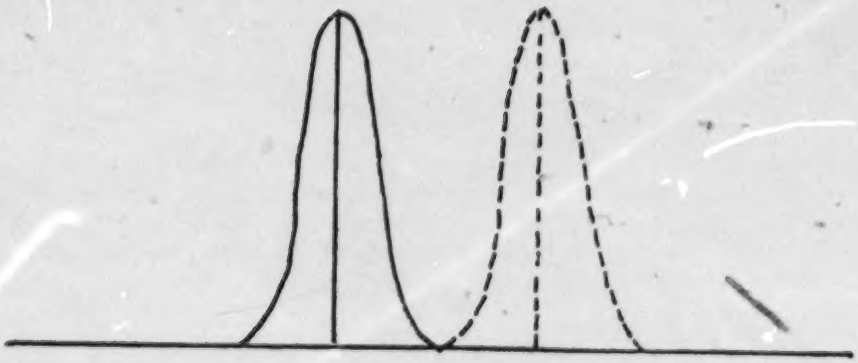


Figure 2 - Variations in Student Groups



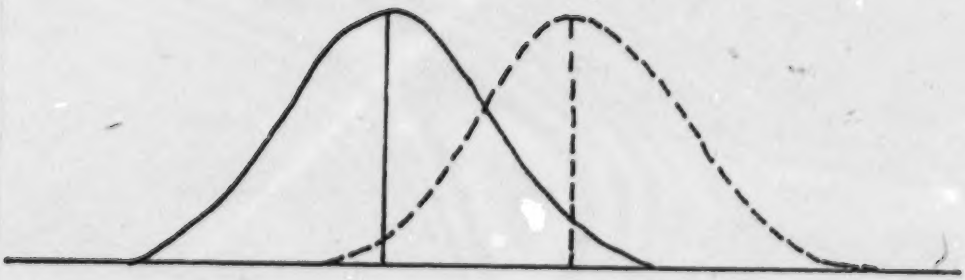


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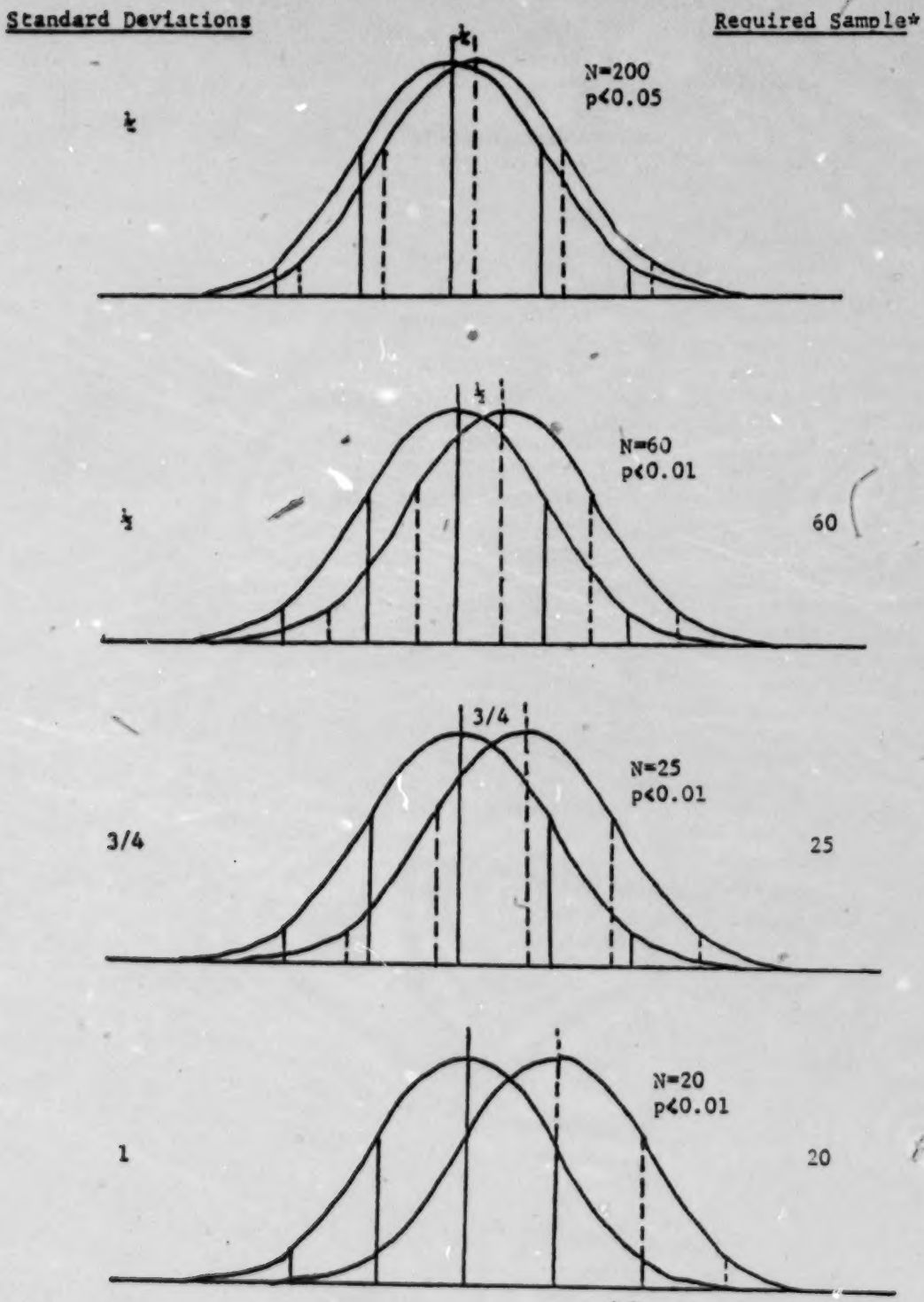
Figure 3 - Minimum Sample Sizes

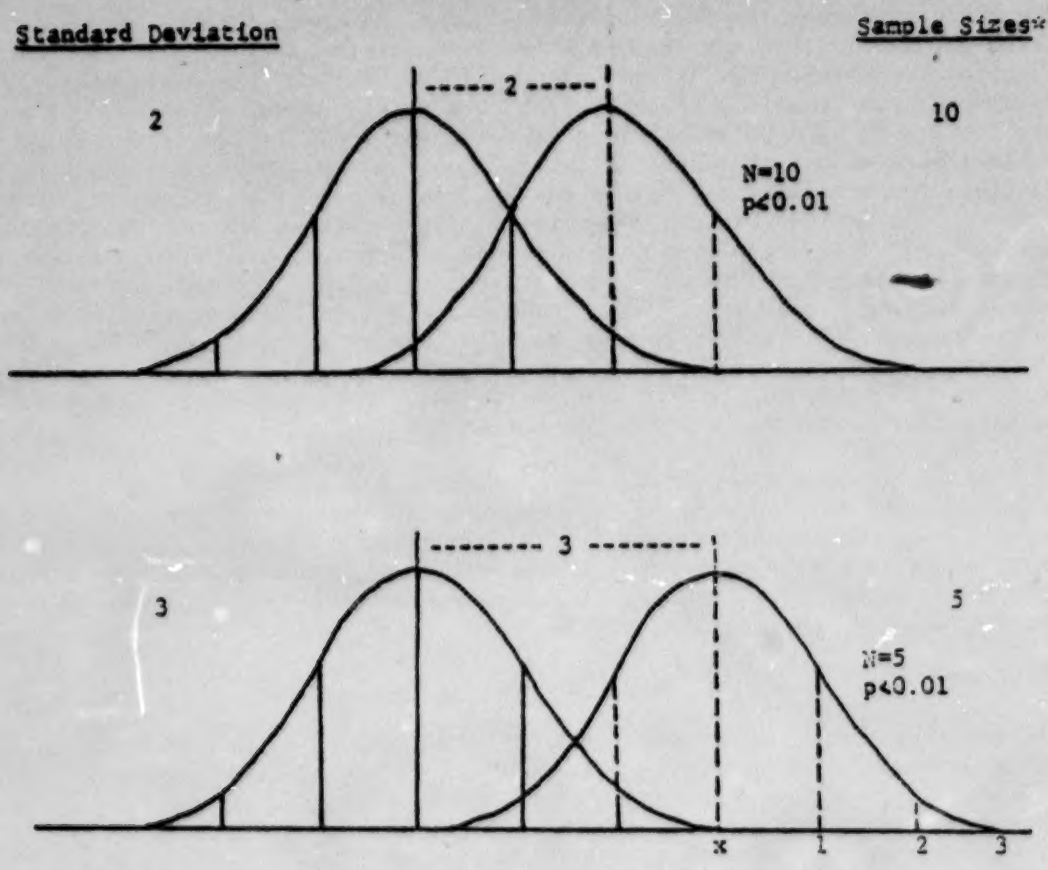
Instrument		Sample Size
E-1 -	Attitudes Toward School	*
E-2 -	Worker Titles	30
E-3 -	Workers in Different Industries	30
E-4 -	Knowledge of the Economic System	
M-1 -	Attitudes Toward School	*
M-2 -	Worker Titles	60
M-3 -	Education and Training Preparation	175
M-4 -	Knowledge of the Economic System	60
M-5 -	Career Planning Activities Checklist	*
M-6 -	Communications About Careers	*
M-7 -	Knowledge About Careers	*
M-8 -	Knowledge of General Career Information	
M-9 -	Considering Careers	*
M-10-	Considering Courses for Careers	NA
M-11-	Student Critique	NA
M-12-	Career Decision-Making (Diagnostic Only)	NA
S-1 -	Attitudes Toward School	*
S-2 -	Worker Titles	175
S-3 -	Education and Training Preparation	*
S-4a/b -	Knowledge of the Economic System	*
S-5 -	Education/Training/Licensing and Union Requirements of Jobs	
S-6 -	What Workers Do on the Job	*
S-7 -	Career Planning Activities Checklist	*
S-8 -	Communications About Careers	30
S-9 -	Knowledge About a Career	*
S-10-	Knowledge of General Career Information	
S-11-	Considering Careers	*
S-12-	Considering Courses for Careers	NA
S-13-	Knowledge About Career Planning	*
S-14-	Inventory of Work Skills	*
S-15-	Student Critique	NA
S-16-	Career Decision-Making (Diagnostic Only)	NA
S-17-	Acquiring and Maintaining a Job (Diagnostic Only)	NA

Figure 4 - Sample Sizes by Size of Difference



43

Figure 4 (Continued)



* For a two group independent sample t-test.

Comparing Programs

The history of research in the social studies has demonstrated the complexities and difficulties of studing human beings. In the physical sciences, it is often possible to demonstrate major effects with one key experiment. It is almost never possible to accomplish this in the social sciences. To establish a principle of similar magnitude in the social sciences, a series of studies by a number of investigators is required. Moving from a laboratory to field setting only complicates the problem of studying human beings. The number of variables that can potentially effect the results of educational research and evaluation studies is immense. Such variables as socio-economic status (SES) have clearly been demonstrated to have effect on learning in a school setting. A number of other factors have been found to give effects in some cases. One answer to this probelm is rigorous empirical research studies. Where school districts have the expertise and resources to conduct this type of research, it is often beneficial. The instruments from the EPIC battery can be used in this type of research.

An alternative approach is an incremental approach. This involves taking existing programs, comparing them, revising based on the comparisons, and then going through the whole process again. The advantage of this approach is that it requires less resources and disrupts existing practices less than a well-controlled experimental study. Its disadvantages are that it produces less information and requires long term commitment to be productive.

Matching Programs

The ideal for matching programs is still the tight experimental design with random assignment of student to well defined alternative programs. Where this is not possible, comparing alternative programs within the smae school with no systematic basis for assignment of pupils to either program is the next best choice. Realistically neither of these choices will be available in many cases. The final alternative is to match students in an experimental program with control students from another school. As a research technique, this is a less desirable alternative. As an alternative to nothing, it has much to commend it, especially if it is only part of a systematic evaluation process.

One factor which has been consistently demonstrated to affect school performance is socio-economic status (SES). The data on student population form on the next page can be used to assemble data on which to select matching schools. Besides this SES data, other relevant data and the opinion of people knowledgeable about the local situation can be used. The general procedure is to attempt to find a comparison school whose students resemble closely those of the experimental school. If several schools have about an equal resemblence to the experimental school, it is better to pick the one which has a somewhat higher SES and/or reading level than the experimental school. This will allow more confidence to be put in results favoring the experimental school.

Another alternative is to randomly select from experiemntal and control student groups within the same school.

Figure 5

Data on Student Populations Form

1. District _____ (Code) __ __

2. School _____ (Code) __ __ __ __ __ __

3. Approximately what % of your students are from families whose annual income is:

   ___ a. $20,000 or more
   ___ b. $15,000 - $19,999
   ___ c. $10,000 - $14,999
   ___ d. $5,000 - $9,999
   ___ e. Under $5,000

4. Approximately what % of your students have parents who are:

   ___ a. Professional or managerial
   ___ b. Sales, technical, clerical or skilled
   ___ c. "Blue collar"
   ___ d. Farm workers
   ___ e. Not regularly employed
   ___ f. On welfare

5. Approximately what % of your students represent the following groups:

   ___ a. White
   ___ b. Black
   ___ c. American Indian
   ___ d. Spanish Surname
   ___ e. Oriental

6. What is the approximate average reading level of your students, according to the last assessment?

Student Grade Levels	Reading Levels
_____	_____
_____	_____
_____	_____

7. Does your school use:

   a. Career education approach — Yes No
   b. ESEA Title I assistance — Yes No

An example of the matching process is contained in Table 1. Reasonable matches exist at each level. But the interpretation of the results from each of them would be somwhat different.

The composition of the elementary level of the control school's student body is such that its students should do better on academic tasks. Thus results which significantly favor the experimental school would be a very strong case for the experimental program. Even equal test scores would be a fair case for the experimental program since the control school should gave done better. Results favoring the control school would indicate that the experimental program is no better than the control program. For the middle and high schools in the example, the matches between schools are closer.

Scheduling the Data Collections

The best time for collecting data in the school year is during the spring months prior to the end of April. The evaluation coordinator should arrange for an entire week for data collection in selected schools in the district.

Instrument Clearance

The evaluation coordinator should present the instruments to the appropriate school district administrator for clearance before collecting data from students.

School Starting Times and Maximum Times

The evaluation coordinator may find that it is best to schedule the elementary data collections in the afternoons; the senior high and middle or junior high data collections in the mornings. The principals should be informed that the maximum time required is one hour for elementary schools; two forty-minute periods for middle or junior high schools; and two hours for senior high schools.

Preparing a Matching Student Groups Chart

Approximately one month prior to the dates set aside for data collection, the evaluation coordinator can use the "Data on Student Populations" form, to select "matching" experimental/control schools at each of the three education levels (elementary, middle and/or junior high, and senior high). The evaluation coordintor should send the form to the principals of the experimental career education project schools where data is to be collected. When the completed forms from the experimental schools have been reviewed, more forms should be sent to the principals of potential matching control schools. After reviewing the "matching" forms, if the evaluation coordinator believes that a socio-economic and reading level "match" has been attained at each level (elementary, middle and/or junior high, and senior high), the evaluation coordinator should prepare a "matching" chart similar to the one in Table 1.

Table 1

	Elementary		Middle		Senior High	
	Exp.	Control	Exp.	Control	Exp.	Control
1) Occupation						
a) Professional or managerial	12	18	12	13	21	15
b) Sales, technical, clerical or skilled	36	50	47	18	35	35
c) "Blue collar"	37	15	30	45	27	30
d) Farm workers			4	12	6	5
e) Not regularly employed	10	9	4	8	6	9
f) On Welfare	5	8	3	4	5	6
2) Income						
a) $20,000 or more		2	10	5	9	
b) $15,000 to $19,999	12	5	10	8	10	3
c) $10,000 to $14,999	33	70	22	43	44	60
d) $ 5,000 to $ 9,999	50	20	29	42	30	34
e) Under $5,000	5		29	2	7	3
3) Ethnic Group						
a) White	47	74	82	98.4	70.00	80.00
b) Black	53	22	5	0.7	29.00	19.00
c) American Indian			3	0.1	0.01	0.25
d) Spanish Surname		4	8	0.8	0.98	0.50
e) Oriental			2	0.1	0.01	0.25

Summary

Criteria	Elementary	Middle	Senior High
1) Matching occupational categories	C*	E	Match
2) Matching annual income?	C	C	Match
3) Matching ethnic groups?	C	C	C

Note: *C indicates control advantages
E indicates experimental advantages

Testing Rooms

The actual testing sites should be those which offer ample spacing, appropriate lighting and climatic and external noise control. In most cases, the cafeteria is usable. The library or a large classroom may be viable alternatives.

Random Student Groups

At all levels of testing the testing of student groups that are accurate representations of the overall student population is critical. The only practical way to achieve this is to randomly assign the students to the testing groups.

In some cases it may be possible to have a list of students randomly selected from the desired student population by a computerized selection procedure. Where this technique is available, it is both the most desirable and the easiest way to select your testing groups.

In many cases a machine selection procedure will not be available. There are many ways that this selection can be done by hand. If for any reason the alternative suggested here is not feasible, any book on research methodology can provide alternative methods.

The method suggested here starts with a complete list of the student population to be tested. The total number of students in that group should be divided by the total number of students to be tested. For instance if the total number of students was 10,000 and the number to be tested was 500, division would result in the number 20. This number should be used to select students. A starting point is picked and then every xth student should be selected. In our example every 20th student on the list would be picked to participate in the testing. The first name to be picked should also be done randomly, e.g. by picking a number out of a hat.

Due to a number of reasons which are always inherent in any data collection, less than the desired number of students arrive and remain to take all of the tests. Therefore, more students than the required number should be requested for testing.

Test Monitors

Additional personnel (monitors) should be requested to aid in the data collection. At the elementary level, two persons for every 25 to 30 students is desirable. At the middle and/or junior high and senior high levels, one person for every 25 to 30 students is usually sufficient.

Community Observers

During the one month scheduling period, the evaluation coordinator should send out the Community-Member Evaluator Form to persons who may like to review the data collections so that they can make a tentative commitment to be available on one of the data collection days.

(Local community members who were present at the March, 1976 data collections, considered their role during testing to be that of "observer," rather than assisting with the actual data collection function. Lay-community members were helpful in the review of various aspects of the data collection and reduction procedures, as follows:

1. Form directions and content.
2. Review of data for completeness and comprehension.
3. Organization for data reduction and use of data.)

Instructions to Students

Students should be told to report to the testing room at the appropriate time. (This instruction should be given the day before testing.) Students should be requested to bring a pencil with them; pencils should also be provided by the evaluation coordinator.

When the evaluation coordinator has arranged for:

1. Instrument clearance
2. Schools to be tested
3. Starting times (and dates) and maximum times
4. "Matching" student samples
5. Testing rooms
6. Random student groups
7. Test monitors
8. Community Observers
9. Instructions to students

the scheduling process is completed.

Community-Member Evaluator Form

Please circle one of the dates below if you would be available for a half-day to review the collection of career and economic test data from students in your school district:

March, 1977			
7	8	9	10
14	15	16	17
21	22	23	24

At which of the following locations:

_____

_____

_____

_____

_____

_____
Community-Member

Note: After we receive your tentative commitment, we will schedule testing on that date.

CHAPTER FIVE

CONDUCTING THE DATA COLLECTIONS

If the planning steps outlined in Chapter Four have been carefully completed, the actual process of conducting the data collection should go smoothly.

The procedures for the data collection (which are in this chapter) are well defined and specific. After the testing is complete, the local community members should review the data collected in coordination with the evaluation coordinator before the test booklets are bundled for scoring and data reduction.

A representative of the Diffusion and Dissemination Section of the Vocational Division should be contacted to discuss the methods of scoring and data reduction which are most advantageous to the school district. Appendices II through V have been included to assist the evaluation coordinator in making this decision.

The test booklets (without the data) should be returned to the regional consultant of the Vocational Division, who will retain the booklets for future use (in this district and in other districts within the region).

After the data reduction and analysis is completed, the results should be delivered back to the evaluation coordinator.

General Procedures

Experimental and control groups should be separated. Students are asked to sit with spaces between each student. Students are allowed to sit only on one side of a table (if tables are used). (This eliminates a lot of cross-talk.)

The test booklets are distributed after the test monitors put an "E" on the front cover for students in the experimental group, and a "C" for students in the control group. Students are asked not to open their booklets until told to do so.

Students are asked to turn to the Background Information page in the test booklets, and to write their name (first and last), grade, date, the school and school district, their age and to circle male or female.

Students are then told that the forms are part of a program to help them with their career planning, as the Purpose and Instructions section is read to the students by a monitor.

Elementary School Procedures

The procedure has been standardized within the fifty-minute time period. There is currently an equivalent of forty minutes of actual testing with ten minutes between tests. Students do not appear to be fatigued at the end of the fifty minutes.

The instruments are administered as follows:

Instrument	Administration Time and Procedure
E-1 - Attitudes Toward School	This is normally a five minute instrument. Students are asked to turn to page 3. A teacher should read the directions twice and each item at intervals suited to the pace of all students. When all students have completed their forms within the allotted five minutes, they are asked to close their booklet.
E-2 - Worker Titles	This is a ten minute, controlled time instrument. Students are given a seperate sheet. After the teacher reads the instrument directions twice, students are told to raise their hand if they need help spelling. All monitors are to help students spell worker titles during the entire ten minutes. The students are told to close their booklets after ten minutes.
E-3 - Workers in Different Industries	This is normally a twenty minute instrument. Students are asked to turn to page 7. A teacher should read the directions and each item to the students at intervals suited to the pace of all students. Ask them to raise their hand if they need help spelling. All monitors are to help students spell worker titles during the entire twenty minutes. The students are told to close their booklets after twenty minutes.
E-4 - Knowledge of the Economic System	This is normally a five minute instrument. The students are asked to turn to page 9. A teacher should read the directions and each item twice at intervals suited to the pace of all students. All students should complete the form together within the allotted five minute time limit. Students are asked to close their booklets when finished. Booklets and pencils are collected, and students are taken back to their classrooms by the teachers.

Middle and/or Junior High School Procedures

The procedure is standardized within a ninety minute time period. There is currently an outside limit of eighty minutes actual testing with ten minutes between tests. This procedure fits comfortably within two periods in most schools. The students do not appear to be fatigued at the end of the ninety minutes.

The instruments are administered as follows:

Instrument	Administration Time and Procedure
M-1 - Attitudes Toward School	This is normally a ten minute instrument. Students are asked to turn to page 3. The directions are read twice by a monitor and the students are told to begin, and to close their booklets when finished.
M-2 - Worker Titles	This is a ten minute, controlled time instrument. Students are given a separate sheet. Directions are read aloud twice and students are reminded to write on the back of the page if more space is necessary. After ten minutes, students are asked to close their booklets.
M-3 - Education and Training Preparation	This is a ten minute, controlled time instrument. Students are asked to turn to page 7. Directions are read aloud twice; students are reminded to be sure they check only ten occupations on each side of the page and to raise their hand if they are unfamiliar with an occupation, and a monitor will tell them what the worker does. After ten minutes, students are asked to close their booklets.
M-4 - Knowledge of the Economic System	Students are asked to turn to page 9 and to work through the rest of the test booklet at their own pace. They are reminded to read the directions carefully; to raise their hand if they have a question; to answer all questions and not to skip pages. They are also asked not to go back and work on any instruments already administered. Short breaks are allowed on an individual basis.
M-5 - Career Planning Activities Checklist	Students are to begin form M-6 after completing form M-5.
M-6 - Communications About Careers	Students are to begin form M-7 after completing form M-6.
M-7 - Knowledge About a Career	Students are to begin form M-8 after completing form M-7.

Instrument	Administration Time and Procedure
M-8 - Knowledge of General Career Information	Students are to begin form M-9 after completing form M-8.
M-9 - Considering Careers	Students are to begin form M-10 after completing M-9.
M-10 - Considering Courses for Careers	Students are to begin form M-11 after completing form form M-10.
M-11 - Student Critique	If the diagnostic instruments are to be used, students are to begin form M-10 after completing form M-9. If not, students are asked to turn in their test booklets after completing form M-9 and return to their current class.
M-12 - Career Decision-Making (Diagnostic Only)	If this form is used it must be handed out and administered separately.

Senior High School Procedures

The procedure is standardized within a two-hour period. There is currently an outside limit of 120 minutes actual testing time. Most schools complete all of the items in less than two hours. Some teachers and counselors think that the two-hour session will be valuable as preparation for pre-college tests.

When the school buzzer rings, most students are conditioned to taking a five-minute break. Some schools are allowed to take the first five-minute break, as some students may need to return to their first period class to collect their books. The second five-minute break is optional for most students. A small number of students may not want to miss their second period class and should be asked to return and finish their forms after that class is completed.

The instruments are administered as follows:

Instrument	Administration Time and Procedure
S-1 - Attitudes Toward School	This is normally a ten minute instrument. Students are asked to turn to page 3. The directions are read twice by a monitor and the students are told to begin, and to close their booklets when finished.
S-2 - Worker Titles	This is a ten minute, controlled time instrument. Students are given a separate sheet. Directions are read aloud twice and students are reminded to write on the back of the page if more space is necessary. After ten minutes, students are asked to close their booklets.

Instrument	Administration Time and Procedure
S-3 - Education and Training Preparation	This is a ten minute, controlled time instrument. Students are asked to turn to page 7. Directions are read aloud twice; students are reminded to be sure they check only ten occupations on each side of the page and to raise their hand if they are unfamiliar with an occupation, and a monitor will tell them what the worker does. After ten minutes, students are asked to close their booklets.
S-4a/b - Knowledge of the Economic System	Students are asked to turn to page 9 and to work through the rest of the test booklet at their own pace. They are reminded to read the directions carefully; to raise their hand if they have a question; to answer all questions and not to skip pages. They are also asked not to go back and work on any instruments already administered. Short breaks are allowed on an individual basis.
S-5 - Education/Training/Licensing and Union Requirements of Jobs	Students are to begin form S-6 after completing form S-5.
S-6 - What Workers Do on the Job	Students are to begin form S-7 after completing form S-6.
S-7 - Career Planning Activities Checklist	Students are to begin form S-8 after completing form S-7.
S-8 - Communications About Careers	Students are to begin form S-9 after completing form S-8.
S-9 - Knowledge About a Career	Students are to begin form S-10 after completing form S-9.
S-10 - Knowledge of General Career Information	Students are to begin form S-11 after completing form S-10.
S-11 - Considering Careers	Students are to begin from S-12 after completing form S-11.
S-12 - Considering Courses for Careers	Students are to begin form S-13 after completing form S-12.
S-13 - Knowledge About Career Planning	Students are to begin form S-14 after completing form S-13.

Instrument	Administration Time and Procedure
S-14 - Inventory of Work Skills	Students are to begin form S-15 after completing form S-14.
S-15 - Student Critique	If the diagnostic instruments are to be used, students are to begin form S-16 after completing S-15 If not, students are asked to turn in their test booklets after completing form S-15 and return to their current class.
S-16 - Career Decision-Making	Students are to begin form S-17 after completing form S-16.
S-17 - Acquiring and Maintaining a Job (Diagnostic Only)	After completing form S-17, students are asked to turn in their test booklets and return to their current class.

Teacher Data Collections

At the end of the data collection in each school, twenty-five Teacher Questionnaires are given to a school coordinator to be distributed to twenty-five teachers. These forms are collected by the evaluation coordinator.

Administrative Data Collections

The Career Education Director's Questionnaire, the School Coordinator's Questionnaire and the Placement/Follow-Up Questionnaire are distributed by the evaluation coordinator. The Community Education Director's Questionnaire is distributed to the director of community education. In the event there is no director of community education, the evaluation coordinator distributes the form to some other appropriate district administrator.

Parent Data Collections

The Community Needs Survey is placed in a stamped envelope and addressed to the evaluation coordinator. The evaluation coordinator distributes twenty-five envelopes for each grade (ten and eleven) to the occupational specialist of the experimental high school; twenty-five envelopes for each grade (seven and eight) to the principals of the experimental middle and/or junior high school; twenty-five envelopes for each grade (two, three, and four) to the principal of the experimental elementary school. These administrators, in turn, distribute the envelopes to teachers, who ask the students to take the envelopes home to their parents. The parents fill out the form and mail the form in the pre-addressed envelope back to the evaluation coordinator.

CHAPTER SIX

USING THE RESULTS

The results of the scoring, data reduction and analysis will be contained in a preliminary report which will suggest some preliminary findings. Interpreting these results in the context of the local situation is the job of the evaluation committee. The committee can use percentage scores, percentile scores and statistical test results as a basis for its judgments. Interpretations of the results should serve as a basis for recommendations for actions, which are included in the final report.

The Report

The report of the data collection should consist of a body, data appendix, and a technical appendix (if necessary).

The body of the report will consist of a narrative discussion of the results of the testing. The scope and language of this section should be geared to the knowledge and background of an informed member of the general public. It should avoid, as much as possible, technical terms and language used only by researchers. Only the data necessary to support the key findings should be presented. None of the data presentations should require special statistical knowledge for interpretation.

The data appendix will contain tables of all the results. This would normally include such information as group means and standard deviations, correlation coefficients, item analyses, item-test correlations, and test reliabilities. If desired, individual student scores could be presented here. This section would normally be of interest to program directors, researchers, evaluators, and any other users who are looking for specific information. It maybe voluminous and difficult for the layman to interpret.

A technical appendix may be included in each report containing the necessary information for research or evaluation specialists. This may contain methodological information and any statistical tables or descriptions of statistical procedures necessary to understand the procedures used or results obtained. This section will use technical terminology and would not normally be meaningful to a person without a background in these areas.

Percentage Scores

Interpreting percentage scores is a judgmental process. The question that must be answered is "What does this test score mean in terms of the student's ability to function in school and in the world of work?" In making this judgment, one must have a clear idea of what the test(s) measure. While the test name gives an indication, the best way to find out is to review the appropriate test booklet and look at the questions on each instrument. By understanding the questions on which the score is based, it is much easier to decide what relation the test score has to school grade, community needs, etc.

Another element in understanding test scores is to know what kind of question is used. For instance, true-false questions usually produce scores of around 50%, even if the students know nothing about the material. Sometimes, there will be information from previous studies which show how the scores relate to important outcomes. Unfortunately, these studies are rare and not normally available. Thus, informed judgment must be used in determining what level of performance is likely to be high enough to assure that students have acquired the knowledge, skills and attitudes that will enable them to become productive citizens.

Using Normative Data

Another aid in interpreting test scores is test norms. Test norms give data about the performance of previously tested students. The scores from the current testing can then be compared to the norms to see how they relate. One important thing to know is the composition of the norm group (the group previously tested from which the norms were derived). While test-makers try to get groups that are representative of the people that are likely to be using the test in the future, the process is difficult and expensive. Thus, the norm group is usually not exactly comparable to the tested group. One should take into account the differences between the groups when interpreting the scores. Normative scores are expressed in terms of percentiles, i.e., the 90th percentile. A percentile represents the percentage of the norm group that scored less than the person or group that it is being compared to. The highest possible percentile score is 99. That means that 99% of the norm group scored less than the person having a percentile score of 99. Percentile scores are very useful except when most of those tested either do very well or very poorly. In these cases, percentile scores are misleading. When everyone does well, somebody still has to get a low percentile score. When everyone does poorly, someone will still get a high percentile score. (See Appendix III for tentative normative data related to this battery.)

Combining Percentage and Percentile Scores

Using both of these scores together can improve the judgments that are made. High percentile and percentage scores are a safe indicator that a student is doing well. Low percentile and percentage scores are a good indicator that a student is not doing well. High percentile scores combined with low percentage scores indicate that nobody is doing well, but the tested group is doing better than most. Generally, this is not a basis for complacency. Conversely, high percentage scores combined with low percentile scores probably should not be a source of concern. They indicate that everyone is doing well, but that the tested group is doing somewhat more poorly. This would indicate that higher scores are possible and the question then is whether it is necessary to try to achieve those higher scores.

Statistical Significance

The concept that frequently complicates the understanding of evaluation results is statistical significance. It is a technical term that is hard to avoid. Statistical significance is usually expressed in terms of a number, for instance 0.05. It is used in interpreting the meaning of differences that may be obtained between groups. For instance, one group might score 45 on a test, while another group scored 63. The question to be answered is "How real is this difference between groups?" In other words, does the difference exist in the real world and would it occur every time the groups were tested, or is it just a chance occurrence that might disappear if we tested the groups again? The lower the number, the more likely it is that the difference is a real one that would exist no matter how many times the groups were tested. So, if statistical significance is obtained at a certain level (for example 0.05), the differences between groups can be treated as real and can be interpreted as such.

However, obtaining statistical significance is only the first step. The next step is determining what, if any, educational importance there is in the significance. (Merely obtaining statistical significance is not a good guide. The problem is that statistical significance is a function of not only the difference between groups, but the number of people tested. Very small, even trivial, differences can be statistically significant if large numbers of people are tested.) The size of the difference must be looked at in terms of the priorities of the schools and the community to determine if the difference is educationally significant, as well as statistically significant.

The first step in determining the educational importance of the results is to relate the results to the current goals and practices of the schools. Very few districts will place the same priorities on each component measured by the battery. Some aspects may not be part of the formal curriculum. There may be considerable variation within the district. Thus, it is important to identify which elements are currently taught and given emphasis and which are not. This can lead to a discussion of the problems that currently exist in teaching specific elements of the battery, as well as problems that are likely to occur if additional elements of the evaluation battery are added to the curriculum. From this information, some of the trade-offs that may be necessary can be identified by the evaluation committee. The trade-offs that are identified should be evaluated in light of the priorities of the schools and the community.

Recommendations

As the committee interprets the data, it should be looking for recommendations that it can make. Each community will have its own special concerns, but here are some things that may exist in any community: The data may indicate that there are community needs that are not being met by the current school practices. These needs may require that new programs or services be designed, with the specific goal of meeting these needs. Frequently, the data will indicate that there are successful programs that are not getting the resources necessary to meet the needs. The programs may be conducted in only a few schools as they may not have enough people, time or materials to cover the district adequately. Finally, there will be programs that are failures. They may have the right objectives, but they simply are not succeeding. Conversely, they may be successful, but with the wrong tasks and objectives.

Another area in which to look for recommendations is the knowledge and skills available in the schools. The world is changing rapidly. Existing programs become old and dated. Schools are continually susceptible to becoming out-dated since they deal in the "known," rather than in generating new knowledge. Realistically, schools cannot be expected to be expert in all areas of human conduct. They must depend on the community for many resources. Schools are constrained to use their existing resources. Thus, ways to make existing knowledge and skill more productive are among the most important ideas that can be generated.

Since schools are composed of people, the organizational structure is important. Organizations are created to maximize people's effectiveness. The organization should allow much more to be done by a group of people than could be done by each individual working alone. Changing the organizational structure is always an appealing recommendation since it generally does not take on a lot of obvious costs. Changing the organizational structure every three years or so is practically an American tradition. Despite its appeal, this type of action has significant concealed costs. Building effective relationships within an organization and learning the necessary skills to operate it effectively consume significant amounts of time. Generally, it is the key personnel who spend the greatest amounts of time in this type of activity. All of this effort can be wiped out by a sweeping re-organization. An alternative that requires more effort in the planning, is to identify ways that the existing organization's strengths can be turned to more productive uses. The costs in this kind of action are more obvious, and the results can be rewarding.

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APPENDIX I

STATEWIDE EVALUATION COMMITTEE

The efforts of the Statewide Evaluation Committee during the first two years of Project EPIC have proven successful. The fact that busy executives have made valuable contributions to the development of an evaluation system for career, economic and community education reinforces the belief that quality education will continue to prosper in Florida.

STATEWIDE EVALUATION COMMITTEE MEMBERSHIP ROSTER, JULY 1974 - JUNE 1976
* Indicates Florida Council of 100 Membership

William E. Allen, Secretary/Treasurer, Florida AFL-CIO, Tampa
Clara E. Bower, R.D., President, Florida Dietetic Association, Daytona Beach
* John B. Boy, President, U. S. Sugar Corporation, Clewiston
* Thomas Bronson, President, Florida Mining and Materials, Tampa
* John Buchanan, Vice President (and Dr. David Konigsburg), Prudential Insurance, Jacksonville
John Carr, Executive Vice President, Pinellas Contractors and Builders, Pinellas Park
Chad J. Chadwick, Executive Director, Broward Manufacturing Association, Ft. Lauderdale
Mrs. Troy Chapin, President, Florida Congress of Parents and Teachers, Orlando
Les Clemens, Executive Director, Florida Credit Union League, Inc., Tallahassee
Ken Dockery, Director of Educational Services, Roofing, Sheet Metal, Air Conditioning Contractors Association, Lakeland
* Willard D. Dover, Attorney, Fleming, O'Bryan, Fleming, Ft. Lauderdale
Fred Drake, Drake Management, Inc., Tallahassee
Robert Ellyson, Partner, Coopers and Lybrand, Miami
Patricia Elmore, President, Standard Systems Corporation, Pompano Beach
* Sam C. Fleming, President, Panama Machinery & Supply Co., Panama City
Dr. Karl J. Foose, D.D.S., Executive Director, Florida Society of Dentistry for Children, West Palm Beach
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C. A. Gertner, Managing Director, Florida Trucking Association, Inc., Jacksonville
Dr. H. Larry Gore, D.V.M., Executive Secretary, Florida Veterinary Medical Association, West Palm Beach
* Gerald H. Gould, President, W. G. Development Corporation, Sun City Center
* William Griffith, General Manager (and Warren Rodgers), Westinghouse Electric, Pensacola
Stanley I. Hand, Executive Director, Aggregates Association of Florida, Inc. and Florida Concrete and Products Association, Inc., Winter Park
George W. Harris, President, Citrus and Chemical Bank of Bartow, Bartow
Glatys Harsin, Vice President, Florida AFL-CIO, Tampa
John T. Hartley, Vice President (and Mrs. Selwyn Edwards), Harris Corporation, Melbourne
Tom Hayes, Executive Vice President, Florida Jaycees, Lakeland
Arthur H. Hertz, Senior Vice President, Wometco, Miami

Mark C. Hollis, Vice President, Publix Supermarkets, Lakeland
* Frank Hubbard, Hubbard Construction, Orlando
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Terry W. Knepper, Secretary/Treasurer, Florida Pollution Control Association, Clearwater
* Jack Lake, Publisher, St. Petersburg Times & Evening Independent, St. Petersburg
* Jack Leppert, Vice President, MGT of America, Inc., Tallahassee
J. Elliot Messer, Attorney, Thompson, Wadsworth, and Messer, Tallahassee
M. Lance Miller, Executive Director, Florida Engineering Society, Tallahassee
John Milstead, Executive Vice President, Florida Bankers Association, Orlando
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* Charles Mundell, President, Lee Drugs, Orlando
Walter Murr, Director of Marketing, Florida Retail Federation, Jacksonville
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* Fred Pettijohn, Vice President, Ft. Lauderdale News, Ft. Lauderdale
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Jim Reynolds, Regional Personnel Director, Montgomery Ward and Company, Inc., Orlando
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* Fred Schultz, President (and Don Koch), Schultz Investments, Jacksonville
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* Robert Thomas, President, Port Sutton, Inc., Tampa
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Local Evaluation Committee Members

State Representative William R. Conway, Holly Hill, Florida
Mrs. Nancye Barrett, Public Relations Specialist, Pinellas County
Mrs. Judy Cannon, Parent, Broward County
Mrs. Ruth Dikman, Executive Secretary, Pinellas County
Mr. Harmon Esson, Insurance Executive, Pinellas County

Mr. Martin Reichle, Business Manager, Gore Newspapers Co., Broward County
Mrs. Sue Serio, Evans High School Advisory Committee, Orange County
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Mr. Al Tanke, Assistant Vice President for Business Development, Landmark Banking Corp., Broward County
Mr. Jack Thompson, Insurance Executive, Broward County
Mrs. Eva Williams, Parent, Broward County

EPIC is indebted to the directors, coordinators and the great number of specialists from the Orange, Broward and Pinellas Career Education Projects for their continual contributions to the validation of the EPIC instrument battery, specifically:

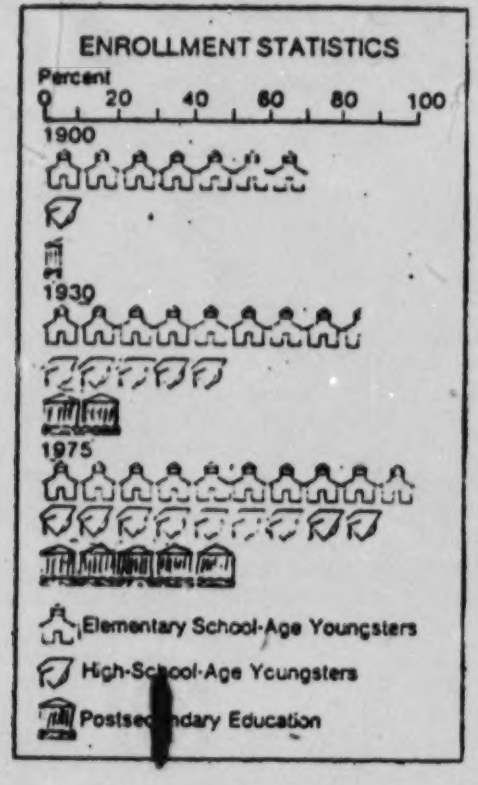
Mr. Bob Megow and Mr. Bill Ripley, Orange County
Dr. Jim Smith and Mrs. Anne McMichael, Broward County
Mrs. Myrtle Hunt and Mr. Bill Rennie, Pinellas County

APPENDIX II

THE CHALLENGE TO PUBLIC EDUCATION

The traditional challenge to the schools of America has been growth. For the first century of its existence, the population of the United States increased thirty percent or more every ten years (Statistical Abstract, 1976). The growth in population has been compounded by the need to offer schooling to an ever greater percentage of the popula- for more and more years. The growth in enrollment is illustrated by Figure 1. The decades of the fifties and sixties renewed the challenge

Figure 1 - American Enrollment Statistics 1900-1975 (Pierce)



as the "baby boom" of the post-World War II era turned into a sustained burst of population growth, compounded by a large increase in the number of students pursuing post-secondary education. In the three decades between 1946 and 1975, total enrollment more than doubled (Statistical Abstract, 1975). Despite the magnitude of this challenge, the schools have provided the necessary facilities and personnel.

Unfortunately, success in one area rarely means an end to challenge. The challenge of growth is effectively over for most of the educational establishment. The school age population of the United States is in a state of no-growth and even decline (Andersen, 1974). The total population of elementary age students has declined slightly in recent years, while the population of high school and college age students peaked in 1975 and will begin a slight decline by 1980 (Andersen, 1974). While

there may be some opportunities for expansion in the fields of adult and professional education, the bulk of the schools face stable or declining enrollments.

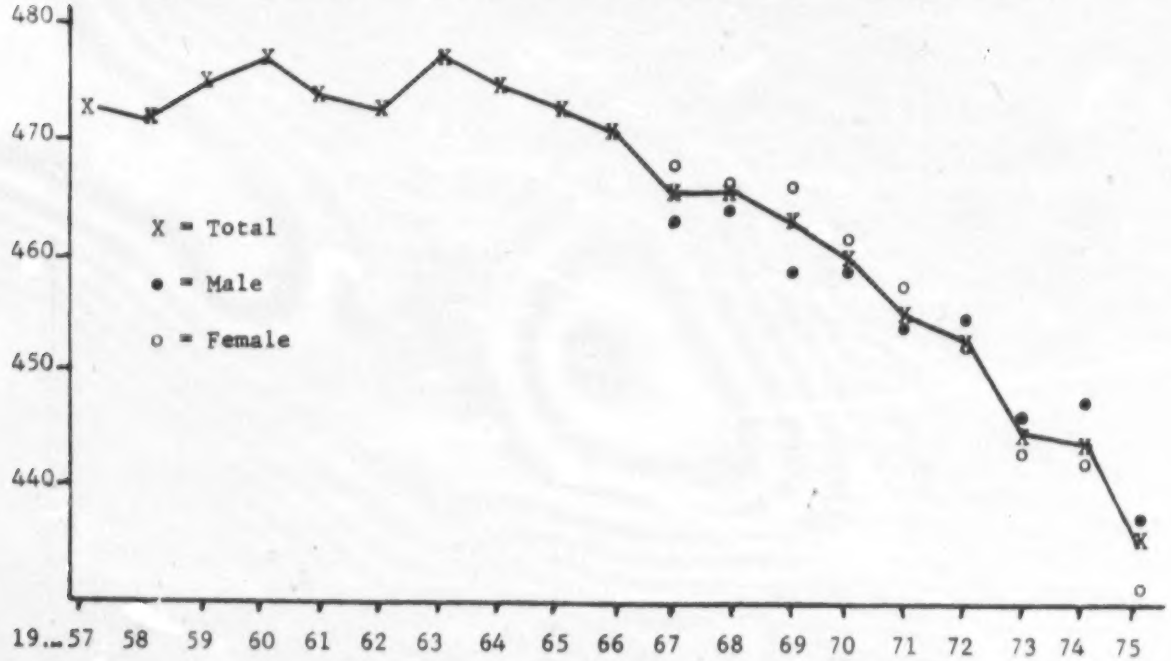
The challenges of growth have been replaced by concerns over the school's effectiveness. The concern for the effectiveness of the schools arises mostly out of the successes of education, not its failures. Precisely because the schools are now the principal concern of virtually all American children between six and sixteen (plus another four to six years for the fifty percent that go to college), the effectiveness of education is a central, national concern. In addition, the American economy has shifted from a manual labor base to a knowledge and thinking base. As Drucker (1972) put it:

> The school has suddenly assumed such importance for the individual, for the community, for the economy and for society, that we cannot suffer the traditional, time-honored incompetence of the educational system. (p. 27)

As the school's effectiveness has become a central concern, a number of measures have brought that effectiveness into question.

In the traditional areas of schooling, virtually all standardized tests have been registering declines in average performance (Harnischfeger and Wiley, 1975). Studies by Harnischfeger and Wiley (1975) and Munday (1976) indicate the results are not artifacts of the test construction and revision process. While some of the change may be explained by changes in the pool of testees, both Harnischfeger and Wiley (1975) and Munday (1976) indicate that other factors such as student preparation and school curriculum are related to the decline in scores. The decline in scores on the Scholastic Aptitude Test is illustrated by Figure 2.

Figure 2 - Mean Verbal Scholastic Aptitude Test Scores for College-Bound Seniors, 1957-1975 (Harnischfeger and Wiley, 1975)



Evidence from the National Assessment of Education Progress shows declines in specific skills. The writing skills of thirteen and seventeen year old students was tested in 1970 and again in 1974. For both age groups, the 1974 samples used a simpler vocabulary and wrote less coherently than the 1970 samples (National Assessment of Educational Progress, 1975).

While there is some evidence of declines in the traditional skill areas, there are a number of additional areas in which schools are now expected to demonstrate effectiveness. One central area of concern is the learning of minority and other underprivileged children. The schools have traditionally placed their emphasis on the middle class student (Milner, 1972). Partly as a result, minority children consistently show lower performance levels than white children (Mayeske, 1973). Political realities suggest that this gap must be reduced.

The schools are also being challenged to produce graduates who can function successfully in everyday life. Evidence from a study by Northcutt and Selz (1975) suggests that less than half of the American adult population is proficient in the skills necessary for adult functional competence. The areas measured by this study and the percentages of the adult population in each of the three levels of competence are contained in Table 1. The competency levels are lowest among the minority groups of the population.

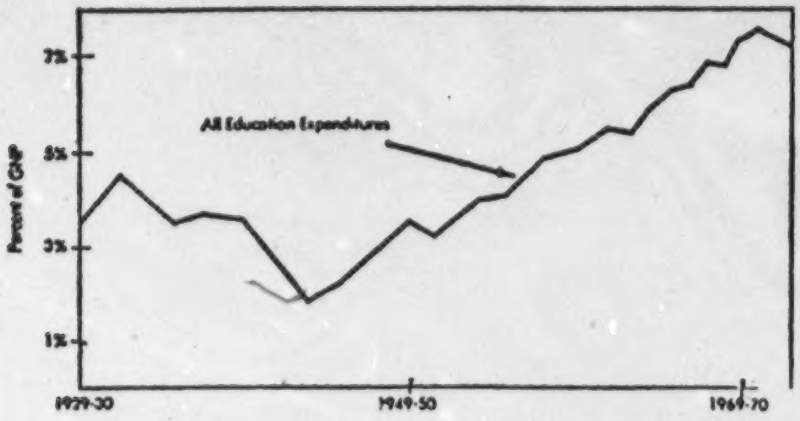
Table 1 - Adult Functional Competence

Areas	Competency Levels 1	2	3
Occupational Knowledge	19.1%	31.9%	49.0%
Consumer Economics	29.4	33.0	37.6
Government and Law	25.8	26.2	48.0
Health	21.3	30.3	48.3
Community Resources	22.6	26.0	51.4
Reading	21.7	23.4	48.5
Problem Solving	28.0	23.4	48.5
Computation	32.9	26.3	40.8
Writing	16.4	25.5	58.1
Overall Competency	19.7%	33.9%	46.3%

Note: Competency levels are: 1) Function with Difficulty
2) Functional
3) Proficient

The challenge to become more effective is not likely to carry with it the promise of important increases in the resources available to meet this new challenge. As Figure 3 illustrates, the schools have experienced a tremendous rise in the percentage of the gross national product allocated to them. This rise in percent of GNP occurred during a period of rapid national growth. Expenditures in terms of dollars increased over ten times their levels in the late 1940's. It is difficult to envision any set of circumstances that would allow educational expenditures to continue to grow at the pace experienced during the last 30 years.

Figure 3 - Educational Expenditures as a Percentage of GNP (Andersen, 1974)



Concerns over the environment, health care, military defense, and capital investment in industry all promise to provide strong competition for available resources. The recent recession has brought into question the ability of the American economy to continue its rapid pace of expansion.

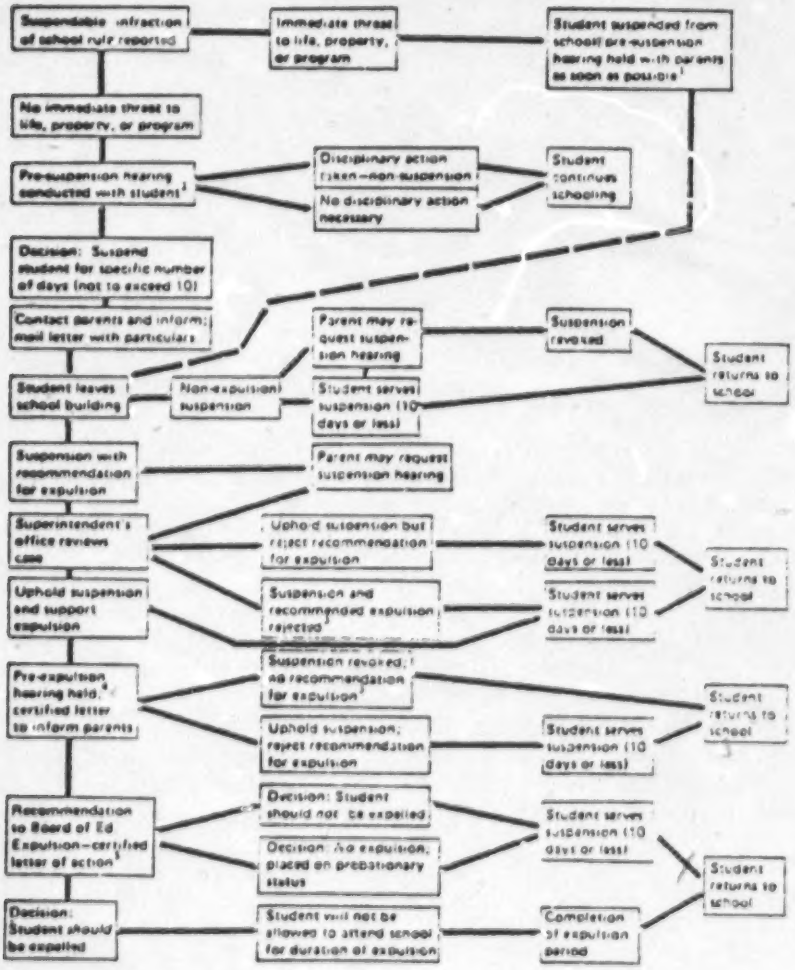
Public support for the schools is at best stable and possibly on the wane. A continuing assault by critics such as Holt (1964), Neill (1960), Silberman (1970) and Postman and Weingartner (1973) has taken its toll. A recent Gallup Poll has shown that the rating of the schools by the public is eroding, especially among the young and the better educated (Gallup, 1976). Both elections (Time, 1975) and surveys (Gallup, 1976) indicate that educational spending is not the public's first priority.

Public support is likely to be adversely affected by the continuing prominence of issues such as school busing, prayer in the schools, and the textbooks that are used. The controversy over school textbooks that occurred in Kanawha Country, West Virginia resulted in violence and the bombing of some schools (Watras, 1975). Violence over busing for racial equality has occurred in Detroit, Boston, Louisville and elsewhere. If Coleman's (1975) analysis is correct, the school busing plans are not leading to greater integration and may be creating greater segregation. This result is unlikely to auger well for the schools or their public support.

Even the end to the strain of preparing for ever larger numbers of students has some disadvantages. While few educators will miss the days of overcrowded schools and undertrained teachers, stable student populations also reflect little need for new buildings or teachers. This has the advantage of freeing the time and energy that went into training new people and designing new buildings. It has the disadvantage of greatly lessening the opportunities for architectural experimentation. It also means that changes in teacher pre-service training programs will have little impact. For the most part, the schools will have to meet this new challenge with the same people in the same buildings that they have now.

The changes in the school's authority to discipline students is likely to complicate the situation (Anson, 1975). In general, the effect of recent court rulings was to limit the exercise of arbitrary disciplinary actions by the schools. Certain exercises of disciplinary powers are eliminated, but the more common response is to require the schools to use a procedure embodying certain elements of legal due process, and is illustrated in Figure 4. The effect of these requirements is to increase the response cost to the schools of exercising their disciplinary powers. The overall result is likely to be a further reduction in the school's ability to control students through the use of aversive sanctions.

Figure 4 - A suggested Model for Procedural Due Process (MacFeeley, 1975)


Suspendable infraction of school rule reported
Immediate threat to life, property, or program
Student suspended from school pre-suspension hearing held with parents as soon as possible[1]
No immediate threat to life, property, or program
Pre-suspension hearing conducted with student[1]
Disciplinary action taken—non-suspension
No disciplinary action necessary
Student continues schooling
Decision: Suspend student for specific number of days (not to exceed 10)
Contact parents and inform; mail letter with particulars
Parent may request suspension hearing
Suspension revoked
Student returns to school
Student leaves school building
Non-expulsion suspension
Student serves suspension (10 days or less)
Suspension with recommendation for expulsion
Parent may request suspension hearing
Superintendent's office reviews case
Uphold suspension but reject recommendation for expulsion
Student serves suspension (10 days or less)
Student returns to school
Uphold suspension and support expulsion
Suspension and recommended expulsion rejected
Student serves suspension (10 days or less)
Pre-expulsion hearing held,[4] certified letter to inform parents
Suspension revoked; no recommendation for expulsion[5]
Student returns to school
Uphold suspension; reject recommendation for expulsion
Student serves suspension (10 days or less)
Recommendation to Board of Ed Expulsion—certified letter of action[5]
Decision: Student should not be expelled
Decision: No expulsion, placed on probationary status
Student serves suspension (10 days or less)
Student returns to school
Decision: Student should be expelled
Student will not be allowed to attend school for duration of expulsion
Completion of expulsion period

1. After "pre-suspension hearing," continue on schematic from the box "student leaves the school building."

2. Cite charges known, witnesses, rule broken, and listen to student's story of incident.

3. School work missed may be made up.

4. Certified letter mailed to parents, and a copy retained with parent signature obtained at hearing. Letter should inform of time, place, date, and charges. Also, inform parent of the right to counsel and witnesses.

5. Mailed to parent, principal, and (if student is under age 16) the district superintendent.

In summary, the school's success in bringing the vast majority of American youth under their auspices has resulted in their playing a central role in American society. With this added importance, their effectiveness has become a much more important issue. At the same time, there is evidence that they are not doing well in the traditional areas, and new goals which they have never done well have become central concerns. The schools are constrained in their response to this new challenge by stable resources, stable or declining public support and reduced disciplinary powers. In short, the schools need to achieve higher effectiveness with current resources.

The problems of the educational system have elicited a wide variety of responses. One of the most active of the responses is the movement toward career education. This movement was initiated by U. S. Commissioner of Education, Sidney Marland (Marland, 1972). With the support of the U. S. Office of Education, the career education movement made substantial progress nationally (Hoyt, 1975). Florida was one of the first states to actively support career education, and is substantially ahead of most of the nation in its implementation of career education activities (Florida Department of Education, 1973).

One basic problem that career education in Florida seeks to attack is as follows:

The Florida Council of 100 Education Committee, in April, 1973 conducted a National Search of school programs to determine: "What is it in the educational system that causes a large number of students to come out as non-contributing members of society?" The assumptions of the Education Committee were as follows:

1. Some of our children are graduating into the job market with limited salable skills and inadequate preparation to advance in our business world. It is not just a problem of funding.

2. As urban population pressures have increased, the role of the traditional family unit has diminished. Most children seldom see their parents at work or really understand what they do. Teachers are becoming substitute parents for our children.

3. Today's teachers have spent their lifetimes in schools and other educational facilities, and decreasingly understand or fairly reflect the real world in which we live and into which our children will graduate. Concerned educators want to solve this problem, but find difficulty changing direction within the system.

4. Frustration is rampant. Parents cannot understand their children. Teachers do not understand what responsibilities are expected of them by parents. Students leave schools unsure of themselves as individuals and unprepared for the world they wish to conquer. Employers are increasingly spending money and time to equip job applicants with entry-level skills.

5. Citizens find it difficult to cope with community problems brought on by modern technology and greater leisure time. As technology has become more complex and as productivity is dependent on fewer and fewer people, the child, or the family, frequently is not directly exposed to "primary production" in the world of work. Modern technology is usually so productive that it tolerates a great many occupations which are parasitical while, at the same time, it has become too complicated for the unsophisticated to comprehend.

The career education movement made progress partly because it does have popular support. Recent surveys (Gallup, 1975 and 1976) show that both the general public and high school students favor having businesses provide on-the-job training as a substitute for regular school, having special job training courses, work-study programs and other career related programs.

While career education is being widely implemented and has popular support, it has its critics as well (Grubb and Lazerson, 1975). These critics claim that career education is fundamentally misconceived and can have no substantial positive impact. At this time, it is too early to answer these objections definitively. While some evaluations of Florida career education programs have been done (Justiz, 1973), much evaluation work remains to be done.

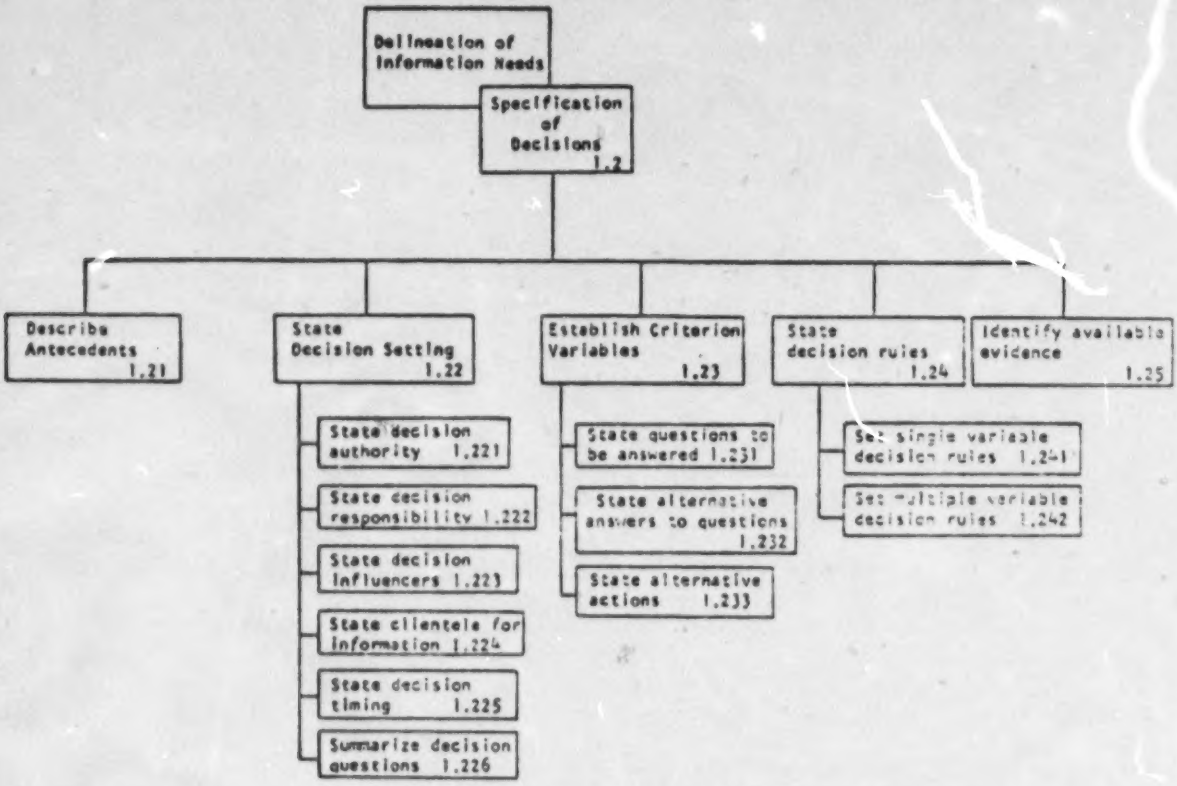
Another response to the problems of education was the advent of educational evaluation techniques to assess the effectiveness of educational activities.

Educational evaluation has seen a tremendous growth in recent years. The major thrust of this growth has been in the development of models which indicate how the educational evaluation process should be conducted. Scriven (1967), Stake (1967), Provus (1971), Stufflebeam, et. al. (1971), Travers (1967) and Hammond (1967) have all made major contributions. Considerable progress has also been made in the area of evaluating education products. Grobman (1968) presented an account of the procedures used to evaluate curriculum development projects. Scriven (1974) developed a comprehensive product evaluation profile. Most of the evaluations that have been published focus on educational services. Evaluation or assessment of students is a continuing process that received considerable attention, perhaps most comprehensively from Bloom, et. al. (1971). Although faculty evaluation received somewhat less attention, there is considerable literature on that subject by Miller (1972), and Biddle and Ellena (1964).

The EPIC evaluation system is an effort to pull together these two major responses (career education and evaluation) to the problems of education. It makes available to those developing and implementing career education programs a comprehensive set of instruments and techniques for evaluating the effectiveness of school-based efforts. The evaluation results can also help point the way to methods of improving the career education methods, when the results are less than satisfactory.

Despite the explosion of education evaluation models, few existing models provide ready guidance for the school or district level educational administrators. Many of the existing general evaluation models are abstract. For instance, Figure 5 illustrates just one component of the overall model formulated by Stufflebeam, et. al. (1971).

Figure 5 - Segment of an Evaluation Model (Stufflebeam, et. al., 1971)


Delineation of Information Needs
Specification of Decisions 1.2
Describe Antecedents 1.21
State Decision Setting 1.22
Establish Criterion Variables 1.23
State decision rules 1.24
Identify available evidence 1.25
State decision authority 1.221
State decision responsibility 1.222
State decision influencers 1.223
State clientele for information 1.224
State decision timing 1.225
Summarize decision questions 1.226
State questions to be answered 1.231
State alternative answers to questions 1.232
State alternative actions 1.233
Set single variable decision rules 1.241
Set multiple variable decision rules 1.242

These general models leave so much to be specified that the working school administrator could not possibly take the time to make all the decisions that are required. At the other end of the spectrum are easy to use methods like Scriven's Product Evaluation Profile (1975). While an excellent tool in itself, it gives the administrator no guidance as to the overall approach to take toward evaluating a school or a school district's performance.

To fill this gap, the procedures set forth here are based on a simple set of assumptions. They are comprehensive. They can be implemented without extensive prior planning or retraining of staff members. Hopefully they will help people in the schools improve the quantity and quality of information on which they base their decisions.

Assumptions

Schools should serve their community. A school's purpose and its services lie not in itself but in the community which it serves. In any society

with a division of labor, people and organizations are interdependent. The school exists to serve the community that supports it. The school must learn how its services are valued by the community in order to tell which of its activities and costs are productive and which are counter-productive. All one can tell by looking at the school alone is that costs are being created. These costs do not necessarily result in benefits to the community. Efforts are often wasted in any organization and schools are no exception.

School must have new ideas. Services are produced by a combination of repeating past activities and by creating new ones. The repetition of past processes is the way that most things get done most of the time. However, pure repetition of the past can only result in things getting done less effectively as new people and situations make old solutions less applicable. Creating new solutions comprises a far smaller amount of the total effort within the school, but it is the only way that the school can hold its own or become more useful and productive.

Existing ideas are getting old. The progress value of new ideas is used up as the ideas are implemented. In terms of ideas themselves, the potential to create progress is highest before they are applied. Frequently, ideas retain important potential for new progress even after their initial application. They can be applied to new situations or combined with other ideas or practices. But eventually, the useful applications are found and implemented. The idea then may become counter-productive as situations change, but the old idea continues to be used even though it is no longer appropriate. The same process occurs in terms of the school itself. Initially, the school which developed or adopted a new idea makes use of it and is more productive than other schools. But as other schools see the idea's usefulness, they adapt it and gain in productivity. The originating school can eventually become less productive than other schools if it holds on and continues to apply the old ideas after better and more appropriate ideas become available.

People are important. What is distinctive about schools are their people and the interrelationships between those people. Facilities and equipment can be duplicated. Even particular knowledge and skills are widely available in the culture. Successful schools are frequently copied as to their exterior appearances, but the successful school continues to be superior because of its unique set of relationships among the people in the school.

The evaluation procedures in this booklet are geared to planning evaluations of schools and school districts in terms of the foregoing assumptions and in terms of the problems that face the schools.

This evaluation system is geared to helping the schools assess and improve the services that they provide to their communities. Schools interact with their communities across two major interfaces. The first is the resource interface. The school draws resources from the community. The human resources, students, teachers, and administrators, are the most important. However, the physical resources, buildings, materials, utilities, etc. are not a trivial investment by the community. Schools

make return to the community in the services that they provide. Ordinarily this consists of student learning, but sports programs and other community services by the school are also of some importance in many communities.

The school should use the community's resources to produce valuable services. In general, that goal is easy to assess and accomplish. A more demanding goal (and correspondingly harder to assess) is for the school to produce services more valuable than could have been achieved with the same resources used differently. For example, there are innumerable ways to teach reading, but the educational evaluation that stops at this point is unsatisfactory. People in the community want more than progress in reading, they want the students to have mastered that skill. Moreover, reading is only one goal. The evaluation must determine the reading instructional methods that produce satisfactory final performance and do it at a reasonable cost.

The first step in producing such an evaluation is to assess the community's needs and resources. In education, that process is called a needs analysis or assessment. A very similar process in business is called a market survey. Most surveys aim at existing needs that can be satisfied through existing methods. At any given time, most of these needs will have been adequately met. The best that such a survey's results can suggest is the way to make minor improvements for isolated groups of people. For example, Table 2 illustrates a needs assessment and school curriculum. Looking only at the top half of the table, the needs assessment tends to show the school doing a good job. But the bottom half shows what the addition of imagination does to the results. The addition of somewhat unconventional goals indicates that there are important goals being left unsatisfied.

Table 2 - Example Needs Assessment

Goal	Importance	School Status
Reading	59	Required Course
Computation	54	Required Course
Writing	52	Required Course
History	49	Required Course
Government	44	Required Course
Literature	41	Required Course
Advanced Math	38	Elective Course
Science	36	Elective Course
Foreign Language	31	Elective Course
Unconventional Goals		
Decision-Making	63	Not Available
Values Clarification	60	Not Available
Occupational Skills	57	Not Available
Economics	57	Elective Course
Interpersonal Skills	52	Not Available

The needs assessment produces information from which the analysis of the school services can begin. Each service provided by the school should be related to a community need which it is intended to satisfy. The next step is to assess how well the existing service meets the need that it is intended to serve. This is in itself a two-step process. The first step is to assess the quality of the information available. This has an important bearing on the subsequent determination of how satisfactorily the service is being provided. The final step is to pull together the rating of the individual services and determine to what degree the needs of the community are in fact being met by the efforts of the school or school district. This provides an overall assessment of the school's efforts in relation to the needs of the community.

However, this information reveals little about the functioning of the school itself. The school exists to transorm the resources provided by the community into valuable services. The primary vehicle by which the school accomplishes this goal is through the people in the school and their interrelationships. Of the two, the people are the most fundamental. It is their individual knowledge and skill that are inappropriate; no amount of money, materials or organizational structure can make the school productive. For example, data indicates that the economic literacy of teachers is frequently not much higher than that of their students. Evaluating schools on this dimension is an important task, and it must be done on a regular basis since knowledge becomes used up and inappropriate unless it grows and is renewed.

The knowledge and skills of the people within the school are made productive through the school's organizational structure. Numerous studies show that a few organizations are less effective than each individual operating separately (Chandler, 1962; Penrose, 1959) and, many organizations are operating at lower levels of productivity than they could be. An appropriate organizational structure is the critical element in determining whether the knowledge and skills of the people in the schools can be effectively applied to the tasks. Of course, the ability to create and maintain an effective organizational structure becomes a set of skills that must itself exist within the school.

The results from studying each of these areas remain to be integrated. This integration can be approached with two different intentions. The school can be judged, typically on a go/no-go basis. This type of approach is used for making accreditation-type decisions. It can also be used when evaluating educational programs or small educational units. The difficulty is in trying to judge any educational organization in isolation. Almost any organization can produce something of value. The question is, could the resources that it uses be better used elsewhere? Unless the elsewhere is specified and specifically compared to the unit being evaluated, there is no sensible comparison being made.

The second approach to integrating results is from the perspective of the decision-maker. This perspective has more general utility since decision-makers have the responsibility for improving their schools on a continuing basis. Integrating the results from this perspective is a two-step process. The first is to identify the discrepancies between what is and what ought to be. The second is to identify the appropriate action to be taken in response to these findings.

What types of discrepancies are typically discovered? The first type of discrepancy is between the products or programs of the organization and the needs in the community. This type of discrepancy can point out any one of three actions and most likely all three. First, it can point out new services or programs that need to be developed. It can also point out existing services or programs that are successful but which are not being supported sufficiently by the organization to take advantage of their success. Almost inevitably there will be failures that need to be terminated or drastically modified as soon as possible.

This second type of discrepancy is between the knowledges of the people within the organization and the knowledges required by the situation. It points to the new knowledges that must be added to make the organization effective. Alternatively, it can point to new directions of development that are more appropriate to the existing knowledges. The idea of adding knowledge to existing knowledge in order to be effective at what the organization is doing now seems the easiest and most sensible. However, the difficulty in changing what the people in the organization are good at should not be underestimated. A change of direction toward the development of services or programs that use the existing knowledges may easily be the best direction especially if the knowledges have changed to a marked degree.

One would expect that a discrepancy discovered in the analysis of the organizational structure would lead to new organizational practices. That is the most common result, but it is not the only possibility. Problems in the organizational structure may point to the need for new knowledges, especially in the handling of people. They may also point to the need for new developments. The organizational structure may not be geared to doing well some of the things that are done now, but it is capable of being extremely effective in other areas. Again, it is often more effective not to tear apart the organization simply to be able to continue doing what was done before. As is true of knowledge, organizational structures are not easy to change for the better. If they can be adapted to a more appropriate task, that may be the more useful solution.

The final general category of discrepancies is that of costs. The most common discrepancy in this area is the identification of wasteful activities. The appropriate decision is to cut them out. The effectiveness of this decision depends greatly on the committment to it. Beyond simply eliminating waste, discrepancies in the cost data can call for new developments, knowledges and organizational structures. New developments can be useful when existing processes are inflexible, excessively costly, or where other products can be spun off from them to take advantage of work that is involved in their production. New knowledge may be required in areas that were previously marginal but now are major activities. New organizational structures may cut costs.

There are four general types of actions that can be taken based on the information generated by this model of evaluation. The most important type of action is the allocation of resources. The easiest decision is to congratulate successful operations but take their key people and resources to throw in support of the failing operations in an attempt to salvage them. The fallacy of such an approach is relatively clear.

The correct approach is to support success and abandon waste as quickly as is feasible. But whatever is done, that decision will probably be the most important result of the evaluation. The other types of actions involve creating something new. New services or programs can be developed. New knowledge can be acquired. New organizational practices can be developed. Each of these actions can be taken in response to the discrepancies that are discovered in the evaluation process.

Thus, the integration of the results from the standpoint of the decision-maker is going to be in terms of actions. While it is not a requirement, the evaluation is an obvious jumping-off point for a major planning process. The data and the implications of the evaluation will provide the factual content necessary. The evaluation process is likely to have gone an important way toward generating the interest and establishing the necessary attitude to support the planning process.

Methods

There are models that provide information with regard to obtaining information on community needs. Hammond (1967) produced a very comprehensive taxonomy of needs that can serve as a basis for examining community preferences. Grotelueschen and Gooler (1972) and Popham (1972) have detailed specific methodologies for collecting data on this subject. Some of the methods developed by business for market surveys may also be useful.

There are also well developed methods for studying the results of the services that are provided. Gottham and Classen (1972) developed an extensive set of procedures adapted to the needs of the practitioner in the schools. Grobham (1968) detailed the methods used in a longer term systematic evaluation of a major curriculum project. A useful tool for summarizing and integrating information is the Product Evaluation Profile (PEP) developed by Scriven (1974).

The study of the knowledge and skill of the people within the school and the school's organizational structure is not as well developed. Justiz (1968) and Popham (1971) suggested methods for designing teacher evaluation systems.

Likert (1967) produced a system for examining the productiveness of various organizational arrangements. However, this system is primarily geared to business organizations.

Instruments

No matter how elegant the methodology, the quality of an evaluation depends on the instruments which are used to collect the data. There are a large number of instruments available to measure various aspects of the school situation. A useful compilation and evaluation of these tests are contained in a series of books by Hoepfner and his colleagues (1970, 1974a, 1974b, 1974c).

Due to the newness of career, economic and community education programs in Florida schools, there was a shortage of instruments available to evaluate these programs. This gap was filled to some extent by the development of the EPIC instrument battery. These instruments cover the areas of student performance, staff, administrative and community needs, and services relevant to the fields of career, economic and community education.

APPENDIX III

INTERPRETING RESULTS

Tentative normative data has been compiled based on student testing during the development of these instruments. Normative data is not available on all instruments. These norms were compiled based on very small sample sizes. They are inappropriate for placing individual students. They can be used cautiously to compare the scores of newly tested groups. Groups obtaining average scores below the 16th percentile or above the 84th percentile differ in important ways from the groups tested previously. As more student testing is carried out, revised norms will be issued.

Instrument	Grade	Student Percentiles	Career Education Scores	Control Scores
E-2 - Worker Titles	2	16	5	4
		84	17	11
	3	16	8	6
		84	23	15
	4	16	14	6
		84	29	19
E-4 - Knowledge of the Economic System .	2	16	4	2
		84	10	8
	3	16	4	4
		84	10	8
	4	16	6	4
		84	10	5

Instrument	Grade	Student Percentiles	Career Education Scores	Control Scores
M-2 Worker Titles	7	16	26	17
		84	49	41
	8	16	31	19
		84	53	46
M-3 - Education and Training Preparation	7	16	8	7
		84	14	13
	8	16	10	10
		84	15	14
M-4 - Knowledge of the Economic System	7	16	13	11
		84	18	17
	8	16	15	12
		84	19	18
	9	16	16	12
		84	19	19

Instrument	Grade	Student Percentiles	Career Education Scores	Control Scores
S-2 - Worker Titles	10	16	28	24
		84	54	51
	11	16	28	27
		84	56	52
S-4a - Knowledge of the Economic System	10	16	13	11
		84	17	21
	11	16	13	13
		84	21	22
S-4b - Knowledge of the Economic System	10	16	10	10
		84	17	16
	11	16	10	9
		84	17	17
S-8 - Communications About Careers	10&11	16	28	24
		84	48	39
S-14 - Work Skills	10&11	16	42	29
		84	70	57

APPENDIX IV

Development and uses of the Instruments

Instruments E-1, M-1, S-1 - Attitudes Toward School

These instruments were created as an initial part of a much larger system for identifying and referring probable early school leavers.

Instruments E-2, M-2, S-2 - Worker Titles

This instrument has demonstrated (most consistently) significant differences between experimental and control students on repeated occassions. It also shows a correlation between higher scores and maturation.

Instrument E-3 - Workers in Different Industries

When this instrument was submitted for review to the Pinellas workshop participants, the following comments were offered: "We got a tremendous response when we asked students to name jobs in certain categories, such as hospital, garden, city workers," and . . . "I like this form better than E-2 because it focuses on more than one kind of worker needed to do a job."

Instruments M-3, S-3 - Education and Training Preparation

This instrument was created from items on a form which asked students to identify workers as unskilled, semi-skilled, skilled, professional or managerial. The managerial category was dropped. Committee members pointed out that several skilled and professional workers were also managerial. Unskilled was combined with the semi-skilled category as it was difficult for committee members to discriminate on several occupations. The resulting unskilled/semi-skilled category became the "Least Training" category and the professional category became the "Most Education" category, leaving the skilled workers to separate these two categories.

Instruments E-4, M-4, S-4a/b - Knowledge of the Economic System

Items were originally developed, based on the Joint Council on Economic Education publication "Manpower and Economic Education," July, 1972.

These items were reviewed and categorized into eight sub-sets as follows:

Profit
Productivity and the Market
Labor Market Demand
Consumer Economics
Business Cycles and Monetary Policy
The Roles of Government
International Trade and Monetary Policy
Comparative Economics

The final items were reviewed several times by the Statewide Evaluation Committee and by educators in the three districts. The final items carry the "agreement" of all reviewers. Items which were not "agreed upon" have been dropped from the instruments. Also, items which ranked below the established computer "reliability" cutoff levels were eliminated.

Instrument S-5 - Education/Training/Licensing and Union Requirements of Jobs Instrument S-6 - What Workers Do on the Job

In an effort to produce a valid instrument in an area of the market which has none to few valid instruments, these two instruments have undergone the most revisions. They originally consisted of ten occupational categories, with twenty to thirty occupations per category, and five items per occupation for a total of 1300 items.

The first major revision produced thirteen occupational categories, ten occupations per category, and three items per occupation for a total of 390 items. A multiple true/false format was devised as a possible advantage over the typical multiple choice form (which rarely discriminates between students in the program and students not in the program). The Florida Jaycees CAP program was used as a checklist while reducing the number of occupations from 250 to 130. EPIC members modified 50% of the items before and after two field runs with Broward and Pinellas County students, grades nine through twelve, in the spring of 1975.

During the summer of 1975, 390 items were categorized into four subsets while adding other items. The instrument contained 520 items while pretesting in Broward, Orange and Pinellas Counties in October, 1975. The four subsets of each occupation dealt with:

a) The level of an occupation, from unskilled to professional or managerial.
b) The education, training, licensing and union requirements of each occupation.
c) The job function.
d) Relationships with similar jobs.

Several items per category were substituted by committee members and the Broward staff as having greater Florida labor-market demand. New items were received from Project VIEW. The instrument was divided into matching forms, each containing four occupations per category from the list of 130, for a total of (8 x 13) 104 items.

The Pinellas participants suggested that "State of Florida" be used to qualify the Florida license, and also agreed with the assumption that teachers should instruct students on differences in occupations on a statewide basis.

The S-5 and S-6 items were separated from the "matching" from into the final instruments.

Instruments M-5, S-7 - Career Planning Activities Checklist

Items were ordered to produce a "continuum" from "looking at careers" to "enrolling in courses" to "research studies" to "working on skills or on a job."

Instruments M-6, S-8 - Communications About Careers

Items were designed to indicate the totality of student "talk" about careers.

Instruments M-7, S-9 - Knowledge About a Career S-11 - Knowledge About Career Planning

A group of items seemed to form two discrete areas of knowledge (rather than attitudes) about careers.

Instruments M-8, S-10 - Considering Careers

This instrument was designed in order that students in grades eight through twelve may be provided an opportunity to identify with a number of occupations across the entire world of work, for eventual exploration. The 130 EPIC occupations are used to represent the entire world of work.

When selecting the original column headings, reference was made to Super: The Individual and His Environment: "Research shows that it is not traits, style . . . that determine occupational choice, success, and satisfaction . . . it is values, interests, aptitides, and . . . performance level." Reference was also made to Ginzberg: Occupational Choice and Approach to General Theory: Wherein the general discussion of fantasy, ability, and reality dimensions of occupational self-concept were considered. Terms relating to style and traits were reserved for instrument S-17.

The original column headings were as follows:

1. Average Interest/Strong Interest
2. Average Ability/Strong Ability
3. No Interest/No Ability
4. Decided to Work
5. Already Working

In the first revisions, the following columns were added or changed:

1. I don't know this job
2. From "Some and Strong Interest" to "I like this job"/"I like this job very much"
3. From "Some and Strong Ability" to "I can do this work"/"I can do this work very well"
4. From "I have decided to work in this job" to "I want to be"
5. From "I am already working in this job" to "I do this now"

At the November 25th EPIC workshop for Orange County staff, the staff suggested some changes in the column headings which resulted as follows:

1. From "I like this job/I like this job very much" to:
   a. "I am interested in this work"
   b. "I want to know more about this work"
2. The "I can do this work/I can do this work very well" column is being eliminated, as it seemed to be a "shadow" of the "I like" column.
3. From "I want this job" and "I now have this job" to "This work is related to my future career"
4. The "I am not interested in this" column is being added at the request of counselors.
5. "I don't know anything about this work" is moved over as the last column.

At the January 13th workshop for Broward County staff, the column "This work is related to my future career" was eliminated and the question placed at the end of the instrument. Pinellas participants want to use the data results for small group sessions.

The final instrument format was reduced to just those column headings which provided significant results.

Instrument S-14 - Inventory of Work Skills

There are a few instruments on the market which focus on work skills via interest tests. They are usually limited in their attempts to represent the skills used in the world of work through a small number of categories (usually 20 to 25), and related codes, and these categories are usually hybrids of occupational titles, student abilities, and work skills.

EPIC took the approach of building actual lists of critical work skills required by each of the thirteen EPIC industrial categories representing the entire world of work, so as to lose nothing in translation through codes, smaller-so-called "representative" categories, or hybrids of grouped variables. This was done through a combined effort of the EPIC membership, Broward and Orange County career education materials, and members of the Orange County staff. EPIC members and Orange County staff members deleted many skills which could not be mastered by twelfth graders. This inventory of skills contained eighteen skills times thirteen occupational categories (total of 234 skills) which employers would appreciate the schools teaching the students, and which (supposedly) can be mastered by twelfth graders. These skills could be put into chart form (similar to the 130 EPIC occupations). Orange County staff members suggested the development of a campaign to issue "Certificates of Proficiency" to students as they "master" each of the skills.

In addition to the gradual reduction of the list from over 1500 work skills, the following modifications were made to this form:

1. The columns "I could learn how to do this" and "I know how to do this" were deleted as being unnecessary and time consuming.
2. A P.E. (Physical Education) column was first deleted, then reinstated, then deleted when the "At Home" column was added.

Several items which twelfth grade students could not master were deleted and others were added, as a result of the Broward workshop and the January 16th conference. The directions were also revised. The total number of work skills included are now 13 x 15 or 195, and are in rough order from simple to difficult tasks.

Selected EPIC members who owned or represented various companies were asked to "Check all of the skills which, if mastered in high school, would save your company valuable training time." One EPIC member said "they all would" which validates the entire list . . . the number of skills checked (out of fifteen per category) are shown below:

	EPIC		EPIC
Construction	14	Restaurant/Hotel/Pers. Serv.	14
Manufacturing	13	Government/Utilities/Public Service	13
Retail/Wholesale	15	Health	15
Business/Office/Accounting	15	Science/Technology	8
Banking/Ins./R. Estate	14	Farming/Ranching/Nat. Res.	10
Mass Communications	14	Transportation	14
Entertainment/Arts	11		

The Pinellas workshop participants said that a "Skills Certificate" could be issued to a Pinellas student for each of the EPIC skills. One Pinellas member suggested that all but a few of the skills were available at the seventh grade level. The final form contains 195 work skills.

Instruments M-11, S-15 - Student Critique

This instrument provided the data which indicated that some of the EPIC purposes had been achieved. (Please see the Introduction section.)

Instrument S-17 - Acquiring and Maintaining a Job (Diagnostic Only)

This instrument was developed in four parts.

Part a - Job Expectations: The following items (unimportant according to students on a Likert scale) have been deleted from this instrument, since the beginning of its development:

1. Allow me to meet the right people.
2. Allow me to retire when I am relatively young.
3. Allow me to supervise work done by others.
4. Allow me to work outdoors.
5. Allow me to meet people who interest me.
6. Allow me to work with my hands.

The Likert scale (most important to least important) is being replaced with the "list ten out of twenty" form which has been successful in the "Work Habits" part of this instrument. The Likert scale was not effective in showing differences between students.

Part b - Employee Work Habits: These items are effective indicators of EPIC-member priorities and are being retained in present form.

Part c - Employee Traits and Mannerisms: These items are effective indicators of EPIC-member priorities and are being retained.

Part d - Interviewing for a Job: The Likert scale was used to eliminate the following items which were "least important" according to EPIC members and students:

1. Be early for the interview.
2. Find out how to pronounce the interviewer's name.
3. Be prepared for at least one surprise question.
4. Participate in a practice interview.
5. Bring a pen and some paper.
6. Get your good points across, but not in a conceited way.
7. Remember not to smoke unless invited.
8. Accept any criticism.
9. Remember not to chew gum.
10. Be pleasant and smile.
11. Be perfectly honest about your financial affairs.
12. Brush up on your manners.
13. Shake the interviewer's hand upon meeting and upon leaving.
14. Gain some knowledge of why the company is in business.

Open ended items were added to each section as a result of the January 16th conference. The responses of twenty-four EPIC members was used as a weighted scoring key. The Pinellas workshop participants considered the data and weighted scoring key valuable for small group sessions with students. When the weighted scoring key did not produce differences between experimental and control students, the instrument became a "diagnostic only" test.

As a basis for Knowledge of Occupations, instruments S-5 and S-6, and Career Planning instrument M-8/S-10, a list of over 1800 occupations was assembled from such sources as the U.S.O.E. Cluster Analysis, Florida VIEW occupations, the Florida Jaycees CAP Project, new career education units developed by the Orange and Broward school districts, a Florida occupations instrument, and a labor-market demand report from the Greater Miami Chamber of Commerce. The Statewide Evaluation Committee was asked to examine the list of worker titles in each of thirteen occupational categories representing Florida's labor market: First, to select the ten most representative titles (where many people work in these occupations) for each category and, second, to substitute occupations with high Florida labor-market demand. This type of revision has been performed repeatedly. The Sexless Dictionary of Occupational Titles was used to insure neutrality in the gender of the occupational titles. The present list of 130 occupations is now considered by the Statewide Evaluation Committee as adequate for the occupational awareness purposes of the project (Orange, Broward and Pinellas County staff members concurring).

The final list of 130 occupations could be published in chart form and distributed to teachers, counselors and occupational specialists throughout Florida schools, with a suggested procedure for use of the 130-occupation chart. At the beginning of each school year, each teacher could begin to check the occupations explored or studied by students: through class discussions, field trips, shadowing experiences, career days, visiting speakers, student research projects, etc. At the end of each term, teachers could submit a one-page form to the principal, showing the extent of career awareness/exploration activity related to the 130 occupations.

At the November 25th EPIC workshop for Orange County staff, the staff suggested that certain groups of occupations be assigned to specific curriculum teachers, e.g., math, science, language arts, social studies, etc. In order to eliminate some of the concerns which teachers are having about career exploration "overlap." Should this be arranged, assigned groups of occupations could be color-coded. For example:

Occupational Categories	Teacher	Color Codes
Health	Physical Education	Blue
Construction	Math	Purple
Science/Farming	Science	Red
Business/Finance	Business	Orange
Government/Transportation	Social Studies	Yellow
Mass Communications	Language Arts	Green
Personal, Hotel, Restaurant	Home Economics	Grey
Entertainment/Arts	Drama/Art	Black
Manufacturing	Shop	White
Retail	Distributive Education	Brown

At the January 13th Broward workshop, several occupations were revised. At the February 18th Pinellas workshop, the 130 List was considered a good tool for teachers to use to investigate and substitute new occupation in demand as a result of future labor market trends.

130 Occupations Most Representative of Florida's Labor Market

(E) For "Engineer," please see the Science/Technology category.

* Least know by students.

** Most know by students.

CONSTRUCTION (E)
- Air Cond. Mechanic
- Architect
- Bricklayer
- **Carpenter/Cabinet Maker
- Electrician
- Equipment Operator
- Painter
- Plumber
- Roofer
- Sheet Metal Worker

MANUFACTURING (E)
- Drafter
- Electronics Technician
- *Expediter
- Garment Cutter
- Industrial Maint. Mechanic
- Machinist
- *Quality Control Tech.
- Tool and Die Maker
- Upholsterer/Furn. Finisher
- Welder

RETAILING/WHOLESALING
- Appliance Repair Specialist
- Buyer/Fash. Coord./Model
- **Cashier/Sales Clerk
- Display Specialist
- Sales Person, Commission
- Security Person
- Ship/Receive/Inv. Clerk
- Supermarket Stock Worker
- Vending Mach. Rout Person
- Wholesaler/Warehouse Oper.

BUSINESS/OFFICE/ACCOUNTING
- **Bookkeeper/Bus. Mach. Oper.
- *Certified Public Accountant
- Clerk Typist
- Computer Programmer/Analyst
- Keypunch Operator
- Office Machine Serv. Person
- Payables/Payroll Clerk
- *Receivables/Credit Clerk
- **Secretary/Stenographer
- **Switchboard Operator

BANKING/INS./R.ESTATE/SECUR.
- **Bank President/V. Pres.
- Insurance Adjuster
- Insurance Agent/Sales
- Loan Officer
- Market Research Analyst
- Mortgage Solicitor
- Real Estate Sales/Broker
- Stock Broker
- **Teller
- *Underwriter

MASS COMMUNICATIONS
- Ad. Layout/Makeup Spec'st
- Camera Oper./Project'ist
- *Copywriter
- Editor
- Offset Press Operator
- Photographer
- Printer
- Publisher
- Recording Engineer
- Reporter

ENTERTAINMENT/ARTS
- Amusement Park Oper.
- Artist/Sculptor
- Dancer/Singer
- Director/Producer
- **Horse Trainer
- Musician/Composer
- Stage Lighting Tech.
- Stage Manager
- **Theatre Manager
- Usher/Ticket Taker

PERSONAL/HOTEL/RESTAURANT
- **Cook/Chef/Caterer
- Cosmetologist
- Custodian/Janitor
- Desk Clerk
- Exterminator/Lawn Sprayer
- Hotel/Rest./Franchise Oper.
- Maid/Housekeeper
- Maitre'D/Waiter/Waitress
- Mortician/Undertaker
- Tailor/Sewer/Mender

GOVERNMENT/UTIL./PUBLIC SERV.
- Counselor/Social Worker
- Firefighter
- Government Employee
- **Lawyer
- Military Person
- **Police Officer
- Politician
- **Teacher/Child Care Worker
- **Telephone Equip. Installer
- Water Treatment Operator

HEALTH
- Dental Para-Auxiliary
- **Dentist
- *Dietician
- **Hospital Para-Auxiliary
- **Nurse; LPN/RN
- *Optometrist
- *Pharmacist
- Physician
- **Veterinarian
- X-Ray Technician

SCIENCE/TECHNOLOGY
- Engineer, Civil/Environ.
- Eng., Civil/Structural
- Engineer, Electrical
- Engineer, Electronic
- Engineer, Industrial
- Engineer, Mechanical
- Engineer, Oceanic
- Engineer, Traffic
- *Meteorologist
- *Research Analyst

FARMING/RANCHING/NATURAL R
- Crop Duster
- Dairy Route Carrier
- Diver
- Farm Equipment Mechanic
- Farmer
- Harvest Hand, Citrus
- *Horticulturist/Nursery Wor
- Miner
- Rancher/Animal Breeder
- Water-Well Driller

TRANSPORTATION (E)
- Airline Pilot
- Auto Body Repairer
- Auto Mechanic
- Auto Rental Agent
- **Driver, Truck
- Longshore Worker
- **Service Station Attendant
- Stewardess/Steward
- Ticket/Reservation Agent
- **Travel Agent